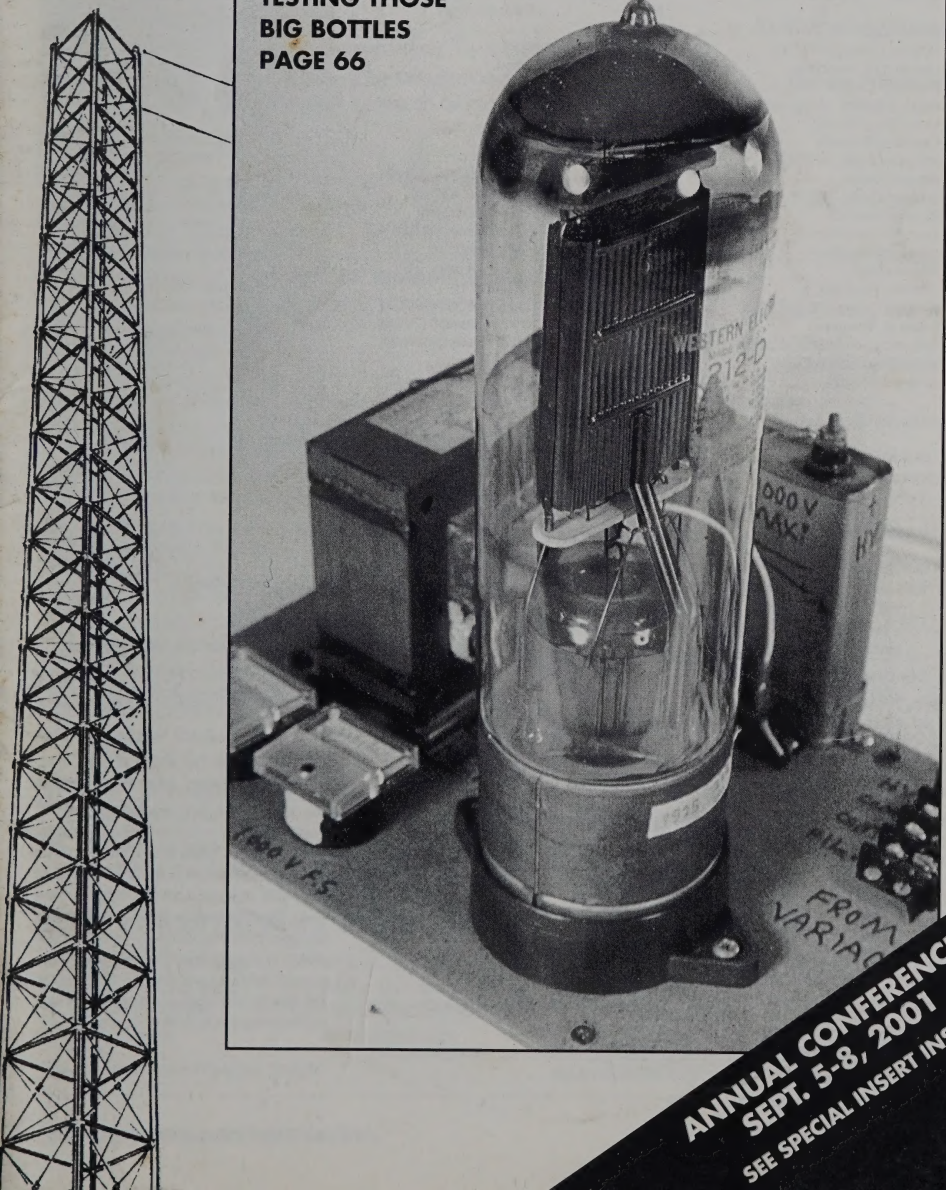
THE OTB

THE OLD TIMER'S BULLETIN AUGUST 2001 VOL. 42 / #3

OFFICIAL JOURNAL OF THE ANTIQUE WIRELESS ASSOCIATION, INC.

Published for the collector, historian and old-time radio operator

TESTING THOSE BIG BOTTLES
PAGE 66



ANNUAL CONFERENCE SEPT. 5-8, 2001
SEE SPECIAL INSERT INSIDE

THE OLD TIMER'S BULLETIN

OFFICIAL JOURNAL, ANTIQUE WIRELESS ASSOCIATION, INC.
BRUCE L. KELLEY 1914-1997, FOUNDING EDITOR

WHOM TO CONTACT

Please write legibly. Enclosing an SASE speeds replies.

DUES AND ADDRESS CHANGES: Joyce Peckham (Secretary), Box E, Breesport, NY 14816, (607) 739-5443; FAX: (607) 796-6230, e-mail: awapeckham@aol.com. Dues: 1 year, $15; 2 years, $27; overseas (airmail), $18. Life membership: $300. Make checks payable to "AWA."

AWA OFFICIAL BUSINESS: William B. Fizette, (President), RR 1, Box 55, Henryville, PA 18332, (570) 629-0637.

BUSINESS CARD ADS: Robert W. Perry, W2TIX, "Smoke Signals," 131 E. High St., Painted Post, NY 14870.

OTB SUBMISSIONS: Marc Ellis, Editor, *OTB,* P.O. Box 1306, Evanston, IL 60204-1306, (847) 869-5016, e-mail: mfellis@enteract.com.

AWA REVIEW SUBMISSIONS: Tom Perera, W1TP, Editor, AWA Review, 11 Square Hill Road, North Caldwell, NJ 07006, e-mail: tomperera@wltp.com.

ORDERS FOR THE *AWA REVIEW* OR BACK ISSUES OF *OTB*: Edward M. Gable, 187 Lighthouse Rd., Hilton, NY 14468, (716) 392-3088.

WANT ADS AND COORDINATION OF SLIDE/VIDEO SHOWS: Richard Ransley, P.O. Box 41, Sodus, NY 14551, (315) 483-9307.

MUSEUM OPERATION: Edward M. Gable (Curator), 187 Lighthouse Rd., Hilton, NY 14468. (716) 392-3088, e-mail k2mp@eznet.net.

ANNUAL CONFERENCE BUSINESS: Bruce D. Roloson, 2 Walnut Place, Apalachin, NY 13732, (607) 625-3031.

FINANCIAL REPORTS: Stanley J. Avery (Treasurer), 5900 Moran Rd., Canandaigua, NY 14424, (716) 784-5109, e-mail: WM3D@frontiernet.net

ANTIQUE WIRELESS ASSOCIATION, INC.
BOX E, BREESPORT, NEW YORK 14816

The Old Timer's Bulletin is published approximately four times a year by and for members of the Antique Wireless Association, Inc. AWA is a nonprofit historical society founded in 1952 and chartered by the State of New York. *The Old Timer's Bulletin* is available through AWA membership. Its issuance is subject to change from time to time as to frequency, content, and size. It is not liable in any way for any buying-and-selling transaction entered into as a result of its content.

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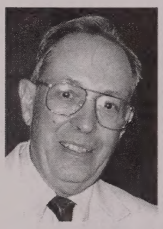
THE PRESIDENT'S MESSAGE

We are sometimes asked just what goes on at the AWA board meetings, and why we take some of the positions that we do. As to what occurs during these marathon sessions, which currently involve board members from as far south as Washington and West Virginia and as far west as Chicago, the November board and membership meetings were reported on in the last issue of *The OTB*. The formal minutes of the May meeting will be approved in November, but I am able to give you a brief unofficial report of what transpired.



Following the activity reports by the secretary, the treasurer, and the president, the secretary reported that current membership stands at 3,738. Arrangements for the Annual Conference were reported on and discussed. This is a major undertaking each year, and involves most of the board members in one capacity or another.

Reports were also given on Museum activities, *The OTB*, the *AWA Review* Volume 14, the *OTB* CD/ROM project, the AWA Chapters status, the insurance update, and the AWA Internet site. The trademark and investment committees also submitted reports.

After two years of work, and involvement by an attorney specializing in New York State law for not-for-profit corporations, the board finally approved new by-laws for the AWA. The by-laws for the Museum will be considered next, along with the separate slate of officers and trustees. The meeting was adjourned at 6:20 p.m., after a slide presentation by Morgan Wesson and Tom Peterson on possible sites for the re-location of the AWA Museum.

On another matter, a brief comment is in order regarding the Annual Conference, which I hope you will be able to attend. While we have a comprehensive program including awards, contests, a banquet, technical and other presentations, as well as the well-known and very popular flea market, there is still a widespread perception that our four-day meeting is nothing more than one big "swap meet." While the board has no plans to change our meeting format, and we all realize that the flea-market serves a very useful function for our members, we suggest that you take a bit of time to sample some of the other activities. You may be pleasantly surprised.

LETTERS TO THE EDITOR

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the OTB *staff or the Antique Wireless Association.*

MARCONI'S ATLANTIC LEAP

I have been reading through a copy of Gordon Bussey's *Marconi's Atlantic Leap* (reviewed in May 2001 *OTB*, page 63), and I am glad to see Bussey give credit for some things to Marconi employees rather than to the inventor himself. And it seems to me that he may have revealed a suitable candidate to be blamed for the design of the aerial that blew down, in the person of Chief Engineer Pochin, who came and went! Be that as it may, it is amazing that on the southern coast of England at the turn of the century, with experts on ships' mast-rigging thick on the ground, such an inept design should have been erected.

The book contains one unfortunately fuzzy photo that I was not previously aware of: that of the enormous "1st Oscillation Transformer," as Fleming entitles it in his notebook, which was eventually abandoned in favour of a Marconi-style jigger for the crucial transmissions.

For my article (*AWA Review* Vol. 7) I sketched this mammoth from Fleming's March 19 description. However, finding Fleming's description of them unintelligible, I obviously went badly astray on the "fibre discs and ebonite insulators." My apologies for that. Readers of the Bussey book would do well to glean what they can from inspection of his photograph, especially as to my eye it shows no obvious signs of having been touched up.

FROM THE EDITOR

With this issue of *The OTB*, AWA members' thoughts turn towards the excitement of the big annual conference in September. Mine are no different, and I expect to be there checking out the flea market tables, enjoying the seminars and auctions, and catching up with old friends.

I've been asked to pass along messages from two dedicated conference volunteers. Bob Schaumleffel, who successfully revived the Annual Sightseeing Tour last year after it had been canceled the previous year due to lack of participation, has another winner of a trip for you this year. You'll travel to Corning, New York by deluxe motorcoach for a two-hour guided tour of the beautiful and fascinating Museum of Glass, recently renovated at a cost of 60 million dollars. Afterwards, there'll be free time for lunch and shopping, or a tour of Corning's well-known Rockwell Museum, before boarding the bus for the return trip to Rochester.

Check the special conference insert in this issue for the timetable and price. If you'd like Bob to send you an advance brochure describing the Glass Museum, contact him at AWA, 417 E. State St., Olean, NY 14760; (716) 372-0360; or jant2@eznet.net.

Bobbi Hagenbuch, who did such a smooth job coordinating the shuttle bus service between the Marriott and surrounding hotels last year, is on board for it again this year. She wants you to know that the service, provided by Golden Memories, begins at 5:30 a.m. Wednesday September 5th for those who want to join the flea market opening feeding frenzy. And it will continue through Saturday, September 8th at 12 p.m. Check local hotels or the Conference registration desk for schedules, pickup locations, and other details.

Remember the "AWA Member e-mail Check-In Request?" Chuck Schwark, our Web page coordinator, informs me that so far only a little over 300 members have registered. A surprisingly low figure, since our membership approaches 4,000! This does suggest that the time is probably not ripe to rely on the Internet for important member communications—though it has been very successful in introducing AWA to the world at large and in recruiting new members.

You'll notice that we are continuing to solicit check-ins (see "AWA News"). So if you are Internet-equipped and haven't checked in yet, please do! The information will be kept absolutely confidential; we definitely will NOT make your e-mail addresses available to outside organizations.

Bob Perry, our Advertising Manager, notes that business card ad sales are falling off. He asks me to remind you that our ad rates are a bargain on any terms—but when you consider that every ad is seen by close to 4,000 hard-core antique radio enthusiasts and remains on their coffee tables for a full three months—the price is an absolute give-away. Remember that all moneys collected for the ads go to further the fine work being done at our museum.

I might add that our classified ads are also in serious decline. The reason for this, I'm sure, is the ease of networking between buyers and sellers on the Internet. But when you consider that these ads are absolutely free to members—and that in addition to appearing in *The OTB* they are posted in the "OTB On Line" section of the AWA Web site—there really is no excuse not to use them. Most members find the classified section to be interesting reading, and I think its decline is a definite loss. So what say folks? Climb on your keyboards and let us hear from you! —MFE

The book's sharp photos look far more professional, and were likely commissioned for publicity purposes. But of course they would have been skilfully touched up where necessary. This does have the advantage of revealing clearly to us detail that the camera failed on. But we have to accept that the retoucher wouldn't necessarily have made sharply visible each and every aerial wire!

And I wonder whether Gordon Bussey by any chance came across any measurements of jigger winding inductances, when he was delving into the Marconi archives for "Poldhu" material? Fleming himself was in a prime position to direct his assistant to measure winding inductances, having both the theoretical and practical knowledge and access, in his departmental laboratory, to the measuring equipment needed.

The seeming absence of any published figures for the winding inductances of the various jiggers that were used is a little curious, as condenser capacitances have been quoted, as well as spark gap settings. So, calculating an exact notional wavelength like 366 metres is not possible. But, like some others, I do doubt whether

(continued on page 20)

AWA NEWS

OTB **POLICY ON PROMOTING EVENTS:** The *OTB* is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Do not send your information directly to the *OTB* Editor. Please send it to Joyce Peckham, Box E, Breesport, NY 14816. Closing date is six weeks prior to first day of month of issue.

Calendar of AWA Activities

AUGUST 11
NWFA/AWA Meet

SEPTEMBER 5-8
AWA Annual Conference (see special insert)

SEPTEMBER 8
Special Board Meeting following Conference Finale Luncheon

October 27
CC-AWA Mini-Meet

November 9-11
VRPS/AWA Convention '01

November 11
AWA, Inc. Membership Meeting followed by AWA, Inc. Semi-Annual Board Meeting

November 11
AWA Museum Membership Meeting followed by Museum Board Meeting

Calendar of Meets

(AWA logo identifies AWA-sponsored events)

ARCI RADIOFEST XX

August 1-5

Presented by the Antique Radio Club of Illinois at the Ramada Hotel, 345 River Rd., Elgin, IL 60123. Large radio swap meet, contest, presentations, donation auction, and much, much more. Auction of the superb radio collection of the late Dr. Ralph Muchow to be held during the meet (see separate announcement below). For more info: contact ARCI at P.O. Box 1139, La Grange Park, IL 60526, e-mail ARCI at arci31280@aol.com, or visit http://members.aol.com/arci31280/arci.htm

RALPH MUCHOW ESTATE AUCTION

August 3-5

To be held at the Hemmins Cultural Center in downtown Elgin, IL. Three separate sales: tubes and radio advertising items on August 3rd beginning 4 p.m.; radios on August 4th beginning 10 a.m.; conclusion of radio sale on August 5th beginning at 10 a.m. Auction By Estes Auctions, 7404 Ryan Rd., Medina, OH 44256. Phone (330) 769-4992; fax (330) 769-4116; e-mail: estesauctions@ aol.com

NJARC SUMMER SWAP MEET

August 11

This all-indoor swap meet runs from 8 a.m. to 1 p.m., with vendor setup at 7 a.m. The new location (American Legion Hall, Dover, NJ) is spacious and air conditioned. NJARC members: $15 per table; non-members $20 per table. First 65 reservations are guaranteed 8-foot tables. A $2.00 club donation is suggested from buyers. From the east, north or south, take I-80 west to exit 35A (Dover). From the west, take I-80 east to Exit 35 (Mt. Hope, Dover). Follow Mt. Hope Ave. south, crossing Route 46 (where Mt. Hope Ave. becomes Bergen St.) and turn right on Blackwell St. Go to the third light and turn left on Warren St. Go two blocks, crossing the RR tracks. The American Legion Hall (2 Legion Place) is on the right. Reservations/directions: Marv Beeferman, 2265 Emerelda Park Dr., Forked River, NJ 08731, 609-693-9430, mbeeferman@cs.com or Phil Vourtsis, 13 Cornell Pl., Manalapan, NJ 07726, 732-446-2427, pvourtsis@att.com. Compete info on our web site: www.eht.com/oldradio.

NIAGARA FRONTIER WIRELESS ASSOCIATION

August 11

Joint meet with the AWA and our largest of the year. At the Amherst Museum, Amherst, NY. From the N.Y. State Thruway, take Exit 49 (Transit Rd.,Rt. 78) north nine miles. Left on Tonawonda Creek Rd. just before entering Niagara County (there is also a Tonawonda Creek Rd. in Niagara County on the north side of the creek). Proceed two miles west to the museum. The meet is outside just west of the buildings. There are lots of motels and restaurants at Thruway Exit 49. Flea market 8 a.m. to noon. Museum exhibits open 11:30 (there's a full room of early radios and TVs). Bring items for the auction beginning about 11 a.m., which will also include the few remaining items from the John Myers estate. There will also be a donation auction. A talk related to early radio will be given at about 12:30. Contest categories: 1. Any battery-powered 1920s radio; 2. Any AC-powered radio; 3. Any tube in original box; 4. Any radio in original box 5. Open category—any radio or radio related item. Entry fee for non-museum-members is $7.00. Spouses $2.00. Includes annual

NFWA membership and museum admission. No additional fees to sell or for any other activity. Lunch available. For info, call Larry Babcock at (716) 741-3082 or Gary Parzy at (716) 668-2943.

AWA SPECIAL BOARD MEETING
September 8
To be held immediately after the Saturday noon luncheon at the close of the conference.

NVRC RADIO OCTOBERFEST
October 6
The annual Fall Antique Radio Mega Meet and Auction begins at 7 a.m. at the Associated Builders and Contractors Building (inside), 1604 Elm Hill Pike, Nashville, TN. Info: Larry Chambers 615-833-2448.

CC-AWA "MINI-MEET"
October 27
At City Lake Park, Jamestown, NC. from 8 a.m.-12 noon. Free admission; there may be a small fee for vendors. For more info: contact Ron Lawrence, 704-389-1166, P.O. 3015, Matthews, NC 28106, or visit cc-awa.org.

VRPS/AWA CONVENTION '01
November 9-11
At the Hampton Inn and Suites, Mesquite, TX, just east of Dallas on I-635. Old equipment contest, technical sessions, four auctions, inside flea market, awards banquet. Theme: centenary of Marconi's first transmission across the Atlantic. Each contest first-place winner will receive one of the new Marconi commemorative 2-pound coins being issued by the British Royal Mint. For more info and registration packet contact Ron Daniel, 1416 Lamplighter Lane, Fort Worth, TX, 76134, 817-293-6257. Or visit http//www.radioremembered.org, or e-mail to radioguy@texas.net.

AWA, INC. MEMBERSHIP AND BOARD MEETING
November 11
At Rochester Thruway Marriott. Take Thruway (I-90) Exit 46, then I-390 North to NY 253 West to NY 15 South. Membership meeting at 11 a.m. **(time changed from 1 p.m.)** Open to any interested member; followed by Semiannual Board Meeting.

AWA MUSEUM MEMBERSHIP AND BOARD MEETING
November 11
Same location as above. Membership meeting at 2:30 p.m. but will be delayed, if necessary, until conclusion of AWA, Inc. Board Meeting. Open to any interested member; followed by Board Meeting.

AWA Member E-mail Check-In Request

With more and more people getting on line daily, it's time for your AWA to explore the possibilities of using the Internet for serious member communications. At this time, we'd simply like to gain some idea of what percentage of the membership is able to access our Web site. If you have that capability, please take a moment and visit the site (http://www.antiquewireless.org). Then click on "Members Please Check In!" on the main menu and fill in the name and e-mail address blanks as directed. It's as simple as that!

If you have already checked in as a result of the notices we've placed in various radio chat rooms and other Internet sites, it is not necessary to do so again.

Thanks,
Antique Wireless Association

Recurring Meetings & Events

•**Antique Radio Collectors of Ohio**—meets first Tuesday of each month at 2929 Hazelwood Ave., Dayton, OH (4 blocks east of Shroyer Rd. off Dorothy Lane) at 7 p.m. Also annual swap meet and show. Membership: $10.00 per year. For more info, contact Karl Koogle: mail to above address; phone (937) 294-8960; e-mail karlkrad@gemair.com.

•**California Historical Radio Society**—For info on current meetings, call the CHRS hotline: (415) 821-9800.

•**CARS**, the Cincinnati Antique Radio Society—Meets on the third Wednesday of each month at ITT Technical Institute, 4750 Wesley Ave., Norwood (Cinci.) Ohio. For more information contact Greg Tierney, (513) 732-1844, or Bob Sands, (513) 858-1755.

•**Carolinas Chapter of the AWA**—Hosts four "mini-swap-meets" each year (in January, May, July and October) plus an annual conference, "Spring Meet in the Carolinas," on the 4th weekend in March. Executive committee meets approximately quarterly. For more info, visit the Web site at CC-AWA.ORG or contact Ron Lawrence, KC4YOY, Chapter President, P.O. Box 3015, Matthews, NC 28106-3015; phone

AWA LIFE MEMBERSHIPS ARE NOW AVAILABLE

Cost: $300

Send your check to AWA Secretary
Joyce Peckham,
Box E, Breesport, NY 14816.
Phone (607) 739-5443
e-mail awapeckham@aol.com

(704) 289-1166; e-mail kc4yoy@trellis.net

•**Central Ohio Antique Radio Assn.**—Meets at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (1-70 Exit 103B). Contact: Barry Gould (614) 777-8534.

•**Delaware Valley Historic Radio Club**—Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Telford Community Center on Hamlin Ave. in Telford, PA. Annual dues: $15.00, which includes a subscription to the club's monthly newsletter *The Oscillator*. For more info contact Bill Overbeck at (610) 789-8199 or Dave Snellman at (215) 345-4248. Club mailing address: P.O. Box 847, Havertown, PA 19053.

•**The Downer's Grove (IL) Park District Museum** sponsors a monthly "Collector's Hour." Participants have the opportunity to display collections at the facility for several weeks before making their individual presentations. The event is open to the public with no admission charge. The museum has also begun to sponsor a yearly "Collector's Fair." For more info, contact Mark Harmon, Downer's Grove Park District Museum, 831 Maple Ave., Downer's Grove, IL, 630-963-1309, fax 630-963-0496, mharmon@xnet.com.

•**Houston Vintage Radio Association**—Meets second Tuesday each month (except Jan. and Dec.) at Lai Lai Restaurant, Tides II Motel, Houston Medical Center, Main and Holcombe Sts., Houston, TX. Meetings include auction/program, 7-10 p.m. Assoc. publishes *Grid Leak* quarterly, monthly activity announcements. Membership $15/yr. Write: HVRA, P.O. Box 31276, Houston, TX 77231-1276, or call Richard Collins, (713) 778-0721.

•**Hudson Valley Antique Radio & Phono Society**—Meets third Thursday of month, 7 p.m. Meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

•**London Vintage Radio Club**—This Ontario, Canada club meets in London on the last Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3IIA, RR#2, Alma, Ontario, Canada. (519) 638-2827.

•**Mid-Atlantic Radio Club**—Meets monthly, usually the third Sunday of the month at the New Hope Seventh Day Adventist Church, Burtonsville, MD. Contacts: President, Ed Lyon, 11301 Woodland Way, Myersville, MD 21773-9133, (301) 293-1773, e-mail lyon@fred.net or Membership Chair, Paul Farmer, (703) 960-0650, e-mail: oldradiotime@hotmail.com. Website: www.maarc.org

•**New Jersey Antique Radio Club**—Meets second Friday each month, 7:30 p.m. Holds three annual swap meets. Contact (send SASE) Phil Vourtsis, 13 Cornell PI., Manalapan, NJ 07726, (732) 446-2427.

•**Northwest Vintage Radio Society**—Meets second Saturday of each month (except July and August), at or about 10 a.m., at Abemathy Grange Hall, 15745 S. Harley Ave., Oregon City, OR. Members display radios, exchange information. Guests welcome at all meetings and functions, except board meetings. For info, write the Society at P.O. Box 82379, Portland, Oregon 97282-0379.

Call For Papers For *AWA Review* Volume 15

Papers are now being accepted for possible inclusion in Volume 15 of the AWA Review to be published in 2002. Papers on any topic related to the history of wireless and radio will be considered. In an attempt to link the Review articles to the annual conference topics, we are particularly interested in papers relating to the main topic of this year's conference, Stromberg-Carlson, and to the various programs and papers to be presented.

Please refer to previous issues of the Review for general formatting requirements and please send all submissions via email to the editor: Tom Perera (tomperera@w1tp.com). Microsoft Word format is preferred. The deadline for submission of completed manuscripts is March 1, 2002.

•**Oklahoma Vintage Radio Collectors**—Meets second Saturday each month, Hometown Buffet, 1012 S.W. 74th St., Oklahoma City, OK. Visitors welcome. Dinner/socializing, 6 p.m.; meeting at 7 p.m. Membership, $12/yr., includes monthly *Broadcast News*. Info: SASE to OKVRC, P.O. Box 50625, Midwest City, OK 73140-5625; or call (405) 755-4139 or (405) 732-6070; or e-mail fkarner@mmcable.com.

•**Ottawa Vintage Radio Club**—Meets monthly (except June and July) in Conference Room, *Ottawa Citizen*, 1101 Baxter Rd., Ottawa, Ontario. Contact: Tom Devey, 601-810 Edgeworth Ave., Ottawa, ON K2B 5L5, (613) 828-5152. Membership: $10 Canadian/yr.

•**Pittsburgh Antique Radio Society** welcomes visitors to our Saturday flea market/contests in March, June, September, and December. An auction is included in September, and our annual luncheon/program is held the first Saturday in December. Our newsletter, *The Pittsburgh Oscillator*, is published quarterly. website: www.nb.net/~schaefer/pars.html For directions, specific dates, information call President Bonnie Novak at 412-481-1563 or write to Karl Laurin, 8111 Sally, White Oak, PA 15131.

•**Society for Preservation of Antique Radio Knowledge**—Meets at 7:30 p.m. the second and fourth Tuesdays of each month in the party room at Cassano's Pizza Parlor, 1700 East Stroop Rd., Kettering, OH. Membership, $18/year. Write SPARK Inc, P.O. Box 292111, Kettering, OH 45429; e-mail sparkinc@juno.com or call John Pansing at (937) 299-9570.

•**Texas Antique Radio Club**—Meets alternate months in Kyle and Shertz, TZ. Contact: Ron Manning, President TARC, 133 East Huisache Ave., San Antonio, TX 78212. Phone (210) 734-6831; e-mail ronmeg@gateway.net; website www.gvtc.com/~edengel/TARC.htm

Service Sources Available

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector. Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA Slide/Video Program

The Antique Wireless Association has available several historical documentaries to loan to affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Richard Ransley, P.O. Box 41, Sodus, NY 14551. The following are available:

VHS VIDEO PROGRAMS

V-2 — "Electrons on Parade." 18 min. 1938 movie made at RCA's Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — "The British Receiver." Documentary of the AWA/BVPS meet with visit to Marconi's Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

V-5 — "The Early Years." Historical documentary narrated by Clarence Tuska telling of the early years of amateur radio, founding of the ARRL and WW I military radio training school. (VHS program transferred from slides.)

V-6 — "The Key." History of the telegraph/radio key covering early hand keys, semi-automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

V-9 — "The Transatlantic Tests and 1BCG." Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

V-12 — "Those Wonderful Magazine Covers." The story of radio through magazine covers. Colorful with period music.

V-15 — "The WHAM Story." Details development of a pioneer radio station in Rochester,

AWA NETS

PHONE:

SUNDAY:

7244 kHz, SSB, noon (NCS:WA4IAM);
3837 kHz, AM 4 p.m. (E.S.T.), 4:30 p.m. (during E.D.S.T.) (NCSs:W2ZM & W2AN)

TUESDAY:
14274 kHz, SSB, 2:30 p.m. (NCSs KC3YE and W0FXY)
3837 kHz SSB, 8 p.m. (NCS WB2SYQ)

MONDAY-WEDNESDAY-FRIDAY:
3867 kHz, SSB, 9:30 a.m. (NCS: W2OBJ)

CW:

DAILY, 4 p.m., 3588 or 7050 kHz.
Protocol, informal. Check both frequencies for activity and join in, or call AWA de (your call) and see what you stir up.

First **WEDNESDAY** of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester Area)

MONDAY, 7:30 p.m. (NCS: K2GBR)
Receive 146.820 MHz
Transmit 146.220 MHz

NY. Program developed with assistance and recollections of Art Kelly, the station's former general manager.

V-16 — "The Charles Herrold Story." Video prepared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting's Forgotten Father who started broadcasting in 1912.

SLIDE PROGRAMS

S-1 — "Portrait of a Pioneer." The life of Elmo Pickerill.

S-2 — "Polar Adventure." Pictures taken by Bud Waite and his narration describing numerous trips to the Antarctic over a 35-year period.

S-3 — "70 Years of Vacuum Tubes." Describes the history of vacuum tubes.

S-4 — "The Early Years." (See description for V-5.)

S-7 — "The Transatlantic Tests and 1BCG." (See description for V-9.)

S-8 — "Trip Through the AWA Museum" Covers exhibits and equipment.

S-12 — "The Key." (See description for V-6.)

With the Chapters

Hello from the Carolinas Chapter. By the time you read this our next event will have already happened. The CC-AWA "Summer Swap Meet" at the L.R. Harrill Youth Center which is on the grounds of the NC State Fairgrounds is planned for Saturday, July 28th. this is the second time for this event in Raleigh. We skipped last year (2000) due to a scheduling conflict with the fairgrounds. If the weather's anything like the first year, it's going to be HOT. That's the main reason that we're planning to have everything inside this year in the air-conditioned meeting hall. I'll be sure to report in the next issue on how the meet came off.

We had a lot of fun a few weeks ago when the club was invited to radio station WBT's transmitter building. With the help of long time CC-AWA Executive Committee member, and now retired WBT Chief Engineer, Ted Bryan we had been offered the contents of the basement that had been used as the stations storage room and junkyard for over 60 years. The "junque" was piled 3 feet deep.

We managed to rescue lots of goodies for our "future" museum, including the last of four of the original 100kW water-cooled tubes from their 30s transmitter, a full set of huge tank coils from the same transmitter, and two RCA "On The Air" lighted signs. In just over 2½ hours the basement was clean. We had collectors drive from as far away as the Washington DC area to take part in the "goodie grab" as we called it. We hope the station will eventually let us in the cabinet upstairs where the old mics are stored.

On the subject of WBT, our 2002 "Spring Meet in the Carolinas" will have as a special theme "WBT, 80 years of broadcasting." WBT's 80th birthday is just a day or two after our conference in March. We're in the planning stages now of setting up a large display of WBT memorabilia, which will include a 4-foot square diorama of the 1927 WBT transmitter site showing the original transmitter building and towers. That has been built by CC-AWA member Ted Miller.

Another BIG event for the 2002 "Spring Meet in the Carolinas" will be our equipment auction. A member who has been an avid collector of military radios for many years has decided it is time to sell his collection. He has 2 mini warehouses packed full of 30s through 60s military electronics.

The meet will be held at the Sheraton Charlotte Airport Hotel on March 21-23. I had a meeting last week with the staff at the Museum of the New South which is located in Charlotte to discuss the plans for their newly rebuilt museum. Some of you will remember we had a radio display there a couple of years ago. The new museum will have a permanent radio display in a recreated 1920s radio store.

The CC-AWA is going to furnish most of the radios for the display and will keep them rotated out so the display stays "fresh". The new museum is set to open in October of this year and we're hoping to have an "open house/reception" there on Friday evening of

(continued on page 16)

RADIO REPRODUCERS

EDITED BY **DAVE CROCKER**, 35 SANTUIT POND RD., #4B, MASHPEE, MA 02649
PLEASE INCLUDE SASE FOR REPLY.

The "Confucius"

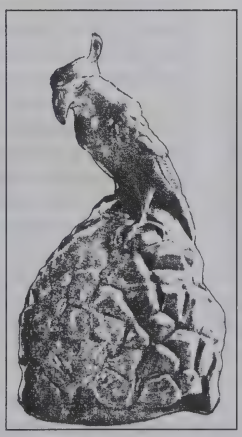
A unique horn-type speaker that shows up once and a while in American collections is the British made "Confucius," manufactured by Andia, Ltd., (Dolton & Co.). It appears to be a small statue of a bearded, meditating, Asian figure holding a long scroll with Chinese markings. He sits atop a wooden platform, waiting to speak.

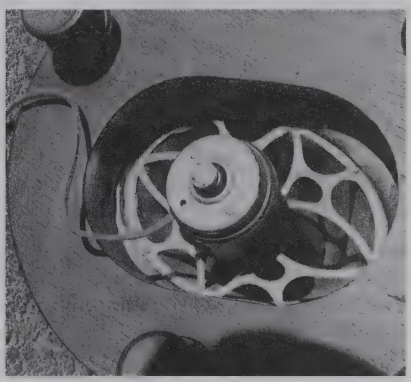
The figure itself, which is dressed almost entirely in black, is constructed of a heavily lacquered papier mache material. The hollow insides, driven by an adjustable, nickel-plated reproducer, serve as a reverberating sound chamber The driver faces upwards, and is attached to a brass, openwork grille. Above the grille is a short metal horn. The entire speaker is 12½" tall, and the 11½"-diameter base is of turned walnut, stained black and rubbed to simulate grain.

Confusing the issue is the fact that another version of the Confucius was produced. It has an identical upper portion, but is mounted on a thick Repwood base with a more sculptured design. Andia also made a speaker in the shape of a parrot standing atop a rock-shaped base. This speaker is entirely made of a ceramic material with a greenish glaze. All three horn speakers require an adjustable Amplion driver.

The "Confucius" speaker made by Andia. The meaning of the characters on the scroll is unknown.

Andia made a version of the Confucius speaker having a different base, as well as glazed ceramic speaker in the shape of a parrot on a rock.





Detail showing how Amplion driver is mounted upside-down in the brass grille.

BY LARRY BABCOCK

NIAGARADIO 2000: A MEET REPORT

If you are wondering why we are now running a report on a meet that took place a year ago, it is—quite frankly—a sneaky trick cooked up by author Babcock to interest you in attending NIAGARADIO 2001. This joint meet of The Niagara Frontier Wireless Association and AWA will take place on August 11 (see "AWA News" for more details)—MFE.

My time at NIAGARADIO 2000 began the day before the meet, when five members of our local club (NFWA) drove to the estate of John Myers to pick up another load from John's collection to auction on 12 August at our annual meet at the Amherst Museum near Buffalo. John Myers had assembled a collection that filled 2½ barns and two basements, and this was in addition to his "personal collection."

This nice 12-tube Zenith shutter dial console from the John Myers estate fetched $275.00 at the auction.

Our club has been taking several trailer and truck loads annually, for the past five years, to various meets, including the fall AWA Meet in Rochester. I had visited Eleanor (John's wife) a few weeks earlier and found only a few consoles. However when the other young guys started poking around many additional items surfaced. There was a beautiful 12-tube shutter dial Zenith console. There were Rider manuals, many meters and enough other things to fill two trucks plus a station wagon!

We even uncovered an unusual early Scott console. This one had legs and two separate tuning knobs with two dials and two sets of tuning condensers. I believe it had only 12 tubes. It had been completely covered with a heavy robe in storage these many years which is why we didn't discover it earlier.

There were also boxes of power transformers, tubes, coils, and books as well as a large pail of nice carved wood knobs, an amplifier, a tube tester and a crystal set. There was even a complete Solovox organ. So we had a good load of nice early radio items to auction the next day, as always with no reserve. Perhaps we will find another cache of John's radios stashed away in time for next year's meet.

As usual, the Meet began when the gates to the museum grounds were opened at 8:00 a.m. There is no need to get up in the middle of the night to attend this Meet, although those driving in from Toronto made a several-hour trip. The Amherst Museum is a collection of local historical buildings out in the country in a park-like setting. The flea market is held on the lawn along the park drive among these restored early buildings. It is a beautiful quiet location.

The antique radio flea market was followed by

AUTHOR'S ADDRESS: 8095 CENTER LANE, EAST AMHERST, NY 14051

AWA Museum Curator Ed Gable (right) clearly enjoys tailgating at the NIAGARADO meets.

three auctions starting at 11:00 a.m. The auction from the Meyers estate took about an hour and 20 minutes. It was followed by an auction of sellers' personal items and a donation auction to support the Club.

My wife and daughter set up in the flea market and reported that sales were good. The weather was beautiful and our usual crowd of about 200 collectors turned out. They were offered complimentary coffee and donuts and there was pop and hot dogs for lunch.

I attend quite a few radio meets each year and have noticed that attendance, especially at the smaller meets, has dropped and there is less of the really nice stuff offered for sale. Of course the decline is attributed to competition from the Internet. This doesn't seem to have happened with our meet, however. Perhaps because it is primarily local. Our attendance grows a bit each year and items offered in the flea market seemed to be as desirable as in previous years.

I have to admit that I, too, scan E-Bay and have picked up a few items for my collection this way. But it is a lot more fun to talk and bargain with the seller and be able to inspect the object personally before making the decision to buy. I have noticed that prices are generally much higher on E-Bay than at our flea market.

I also find looking through the items one at a time on E-Bay to be quite slow, whereas at a meet I can quickly glance at a table full of items. At a flea market the sale is fast and you go home with the item. There is no wait for the mail and no surprise when you finally see what you have bought.

NIAGARADIO is a joint meeting with the AWA. They are very helpful to us by reporting these events in *The OTB*. The AWA was also well represented by the presence of Ed Gable, Curator of the Association Museum in Holcomb, NY. Ed even set up a table in the flea market and had some beautifully clean sets for sale plus a lot of brand new tubes.

There was no formal talk given this year, but Jim Kreuzer and his entire family came and Jim's wife, Felicia, went through the crowd showing items from their Marconi collection. That was very interesting to see.

The Amherst Museum has very nice exhibits displayed and was open one hour earlier than usual to allow the Radio Meet attendees to view the collection. It is well worth seeing. Our local antique radio club, the NFWA, has an exhibit of members' finest radios in one room. This display is changed annually so that collectors coming to NIAGARADIO see different artifacts each year. *(continued on page 16)*

EQUIPMENT RESTORATION

EDITED BY **KEN OWENS**, 478 SYCAMORE DR., CIRCLEVILLE, OH 43113
e-mail radio199@hotmail.com
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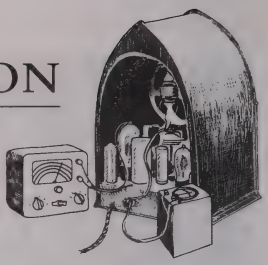

Plug-In Forms; Doctoring a 1R5; Replacing Resistor Line Cords

At the last AWA Conference, Marc Ellis' seminar on restoration generated so many questions that it could have lasted for hours. Marc plans a repeat this year. He and I have discussed the need for a place where readers can get answers to restoration questions quickly. Over the years I have responded to mailed-in questions from readers and have used some of the material in this column.

We are going to try a Q&A section in this column. You can direct questions to my e-mail address above or by regular mail (with a SASE). We will respond as fast as we can so you won't have to wait for the next issue of *The OTB* to get an answer. Questions of general interest will appear in this column.

If the response justifies it, we will consider establishing a separate Q&A column in *The OTB*.

♦ ♦ ♦ ♦

Jim Fred, 5355 South 275 West, Cutler, IN 46920 wrote concerning the suggestion from Alton DuBois (Queensbury NY) on making your own plug-in coil forms (see Feb., 2001 *OTB*, p. 47). If you don't feel like using your time that way, Jim makes coil forms for sale. He uses the lowest loss XXP phenolic material with heavy nickel-plated brass pins. Jim offers forms for the Pilot Super Wasp and the National SW-3, as well as generic 4, 5 and 6 pin forms. He sent me a sample of the SW-3 form. It is a work of art that has to be seen to be appreciated. Contact Jim if you need special or standard coil forms.

♦ ♦ ♦ ♦

Speaking of Alton, he sends a word of caution regarding the item we ran last issue about adapting a 1R5 to replace a 1L6 (May, 2001 *OTB*, p. 65). The original article suggests using a pair of diagonal cutters for removing pin 5 of the 1R5. Alton says this is a sure way to crack the tube. He uses a cutoff wheel in a Dremel tool with a piece of tin under the pin to protect the glass. Your Editor uses a jeweller's saw with an 8-0 blade.

Jim Fred (see above) also sent me an adapter which he supplied to a parts vendor several years back. It adapts a Loctal 1LA6 to the 7-pin 1L6 socket. I haven't tested it yet, but it is as beautiful as his coil forms and seems like it would add very little capacitance.

♦ ♦ ♦ ♦

There has been a lot of interest finding a replacement for the resistor line cords used in early AC/DC sets. NOS cords can be found, but all the ones I have seen are hard, brittle and unsafe. Let's look at the requirements for a resistor cord. A survey of Rider's shows 4 typical tube lineups listed in order of worst case to best.

TUBES	VOLTS	LINE CORD	WATTS	SET
1-6V + 1-12V	19	330Ω	30	Kadette Jr.
4-6V	25	310	28	Kadette Universal
4-6V + 1-12V	38	270	24	Several
4-6V + 2-25V	69	160	14	Many

Line cord resistances are those given by Rider, and the wattage dissipated in the cord is calculated from the filament current of 300 mA. On a 120V line, the cord and filament string consume a total of 36W.

The simplest fix is to replace the line cord with a power resistor, R, inside the cabinet as in Fig. 1. Bill Mitch, N9JTR (Hebron IN) uses Dale resistors. These resistors are enclosed in metal cases designed to be bolted to the chassis, which acts as a heat sink (remember the old "Candohms"?). A 50W Dale is no larger than a 20W vitreous resistor.

The problem is heat. The Kadettes are not designed to have another 28-30W of heat inside the cabinet. The Kadette was the first set to use plastic cases. That's where their value is, so we can't do anything to endanger the case.

It might be acceptable to put the resistor inside

the cabinet in the best case. It could probably handle another 14W if you don't run the radio continuously. The Philco Model 54 does use resistors inside the cabinet, but it is designed with excellent ventilation.

Another fix (for the first and second cases in the table) is to use a small transformer, T, as in Fig. 2. Units rated for 24V/450 mA available from Radio Shack. Plug-in wall transformers rated at 19 or 24V are available from Hosfelt (800-524-6464). The first can usually be mounted inside the cabinet. The wall units can be used with 3 wires running to the radio, and no chassis modifications are required.

The third method for reducing the line voltage, suggested by Richard Hurlbut (Toronto ONT) and Walter Curry (La Mesa CA), is to use a diode, D, as in Fig. 3. A lot of misinformation has been printed about this method. Many people think that, since the output of the diode is half of a sine wave, the voltage will be half of 120V or 60V. If you believe this, you'd better have a lot of spare tubes on hand. As Walter points out, the heating value of the diode output is 0.707 times the input. For a 120V line, the output is 85V, not 60V. Don't try to measure the voltage with anything other than a true rms AC voltmeter. You won't get meaningful readings with a VOM, a VTVM or a DVM. Just take our word for it or do the analysis yourself.

Even with a diode, a series resistor, R, will be needed to drop the 85V down to the filament requirements, but the resistor wattage is reduced considerably. In the Kadette Jr. (first case) where the filament string requires 19V, we need a 220Ω resistor to drop the 66V difference. The dissipation is 20W—still too much for this little set. The Kadette Universal (second case) would require a 200Ω resistor dissipating 18W—also too much.

Radios of the third case would need a 150Ω series resistor dissipating 14W. This is better than a resistor alone dissipating 24W, but borderline depending on the cabinet design and ventilation. Fourth case sets require a 50Ω resistor dissipating about 5W—a big improvement over 14W with a resistor alone. You should have realized, by now, that using a diode eliminates 10W of heat.

If you use a diode, Walter notes that the negative end of the diode should face the filaments. It may be necessary to place a small (0.005 μF) capacitor across the diode to eliminate hum or buzz, if present.

The method shown in Fig. 4 takes advantage of the fact that a capacitor behaves like a resistor when passing AC and can be used to reduce the line voltage. This is not a new idea, but thanks to John Uscinowski (Greenwich NY) and Bill Mitch for reminding us. John sent a reprint from a British journal, *Radio Bygones*, No. 33, Mar. 1995, describing how to use a capacitor to drop the 240V British mains to 120V to operate an American AC/DC set.

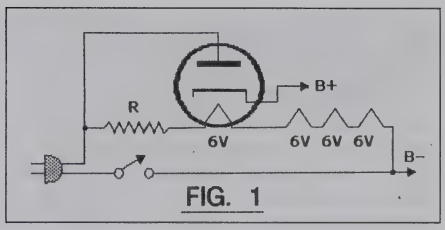

FIG. 1

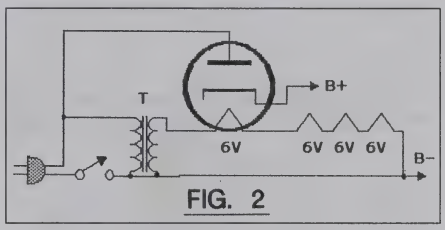

FIG. 2

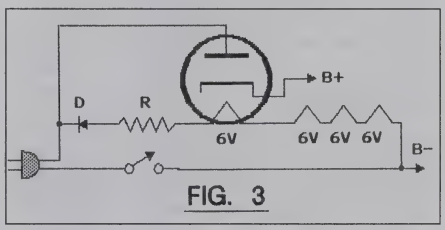

FIG. 3

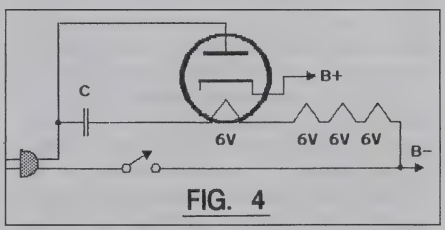

FIG. 4

The calculation may seem strange because the results don't add up. They are vector quantities. Think of a right triangle. The line voltage (VL) is the hypotenuse and the filament voltage (VF) and voltage drop across the capacitor (VC) are the other 2 sides. Pythagoras says that $VL^2 = VF^2+VC^2$.

For the worst case of 19V for the filaments and a 120V line, $VC = \sqrt{(120^2-19^2)} = 118V$. The filament string draws 0.3A, so by Ohm's Law, the reactance, XC, of the capacitor must be

118/0.3 = 395Ω. The reactance (AC resistance at a given frequency) is XC = 1/2πfC or C = 1/2πf × C where f is the frequency (60Hz).

C = 1/(6.28 × 60 × 395) = 0.0000067. The result is Farads so multiply by a million to get 6.7 µF. Yes, a 6.7 µF capacitor can replace a 30W resistor. The only energy consumed by the capacitor goes into dielectric heating— negligible in modern capacitors rated for AC service. Thus a voltage-dropping capacitor generates no heat.

Finding a capacitor of the proper value may be difficult. Don't use electrolytics, even back-to-back. They get hot when carrying AC current. Use Mylar or polypropylene units. As a rule of thumb, the AC rating of a film capacitor is 40% of its DC voltage rating. A 400V DC capacitor can easily withstand 160V AC. If you can't find a combination of capacitors to give the required value, you can put a resistor in series with a larger value.

WITH THE CHAPTERS, *continued from page 10*

the 2002 Charlotte meet.

The Carolinas Chapter now has our own Amateur Radio club call sign. CC-AWA member Richard Wayne W4LN has agreed to be trustee of our club call. I got the idea for applying for one back in February when I happened to see that W4AWA was about to become available as a vanity call. A few weeks ago at the Winston-Salem NC hamfest a group of us were talking about setting up a vintage station at next year's Charlotte meet when the subject of a club call came up. I told them about W4AWA and Richard asked if I wanted him to pursue it. Of course I said yes. By Wednesday of the next week we had been issued a club call of KG4OBX. By the time you read this we should have W4AWA assigned as a club vanity call. We hope to have a "Special Event Vintage Station" on the air at the 2002 Charlotte meet.

I was going thru a stack of old magazines the other day when I ran across an interesting write-up by James Fred is his old "Antique Radio Corner" column in the July/August 1975 issue of *Elementary Electronics*. Along with his reports of various meets was a paragraph that began and I quote: "A regional branch (chapter?) of the Antique Wireless Association has been organized in Winston-Salem, North Carolina. All collectors living in the are urged to contact L.W. Elias for details on how to join the club." WOW, does mean that there was an "official" AWA chapter in North Carolina in 1975?

Mark your calendars now for our "Fall Swap Meet" on Saturday, October 27th. As always our "Swap Meets" take place on Saturday mornings from 8 a.m. - 12 noon. and the admission is FREE. You can find more details on CC-AWA events by visiting our home on the world wide web at CC-AWA.org. You are also invited to join the CC-AWA's e-mail reflector by sending a blank message to cc-awa-subscribe@yahoogroups.com. Or you can still do it the old-fashioned way and write to me at CC-AWA, P.O. Box 3015 Matthews, NC 28106-3015, or call 704-289-1166 after 6 p.m.

Ron Lawrence, KC4YOY
President, CC-AWA

NIAGARADIO, *continued from page 13*

The club built a wall of windows to depict the store front of a radio store from the 1920s, and our items are exhibited behind these windows. This keeps them dust-free and eliminates problems with viewers "interfacing with the artifacts." Presently there is a large display of early television and related objects in two windows to celebrate the 50th anniversary of local television. Another window displays radios from the early 1920s to commemorate the 80 years since KDKA first came on the air. A fourth window depicts a 1920s radio service bench. The club has maintained this exhibit for over 20 years.

There is an old-time radio that plays vintage radio programs whenever a visitor enters the room, and a prerecorded message describes the display. The rest of the room contains radio artifacts owned by the Museum.

The $5.00 Meet entrance fee included admission to the Museum. There is no extra charge to set up and sell. Hope to see you in August 2001! Look for the announcement in *The OTB*.

EDITED BY **JOHN CASALE**, W2NI, 3 PICKERING LN., TROY, NY 12180
PLEASE INCLUDE SASE FOR REPLY.

The Ghegan Patents

John Joseph Ghegan was an important figure in the telegraph industry from both technical and business perspectives. His unique innovations (he held nearly 30 U.S. patents) and his position as president and general manager of J.H. Bunnell and Co., the dominant telegraph instrument manufacturer of the time, afforded him significant influence.

Ghegan was born near Dublin, Ireland in 1851 and emigrated to the U.S. as a young boy, residing in Pennsylvania. He was barely a teenager when he learned Morse at Western Union's office on 3rd and Chestnut streets in Philadelphia. He began his career as a telegrapher with the Camden and Amboy Railroad and worked for numerous companies during his teenage years. Becoming known as a hard-working telegrapher with thrifty work habits, he quickly progressed to the position of night manager at Western Union's office in Newark, N.J.

One of his early experiences as a telegrapher at Newark took place during the Franco-Prussian war. He provided the latest bulletins to a local newspaper after office hours by running a local loop from the office to his room across town. Ghegan would set his alarm to get up in the middle of the night so that he could copy news off the Associated Press wire out of New York. He would place the copy under his door to be picked up by a courier just in time for the morning editions.

Later at Newark he helped The Gold and Stock Telegraph Company, a Western Union subsidiary, organize their stock ticker circuits. In 1878, he set up and managed the city's first telephone exchange. He personally went door to door signing up new telephone subscribers and installed the lines by running them across rooftops of homes if necessary. In 1879, his phone directory for the entire city consisted of a single page of less than one hundred subscribers.

After American Bell Telephone won their patent infringement suit against Western Union, Bell took over the Newark exchange but Ghegan decided to stay on with Western Union as Newark district manager. In 1883 he was recruited by the Mexican Northern Telephone and Telegraph Company and accepted the position of vice president. He is credited for establishing some of the first telephone exchanges in Mexico.

John Joseph Ghegan

Ghegan returned to the U.S. in 1885 to begin his long association with J .H. Bunnell and Co. in New York. He was originally hired as a technical advisor and export manager. In 1903 he became the company's president, a position he held until his retirement in January of 1926.

During Ghegan's long and productive life, he invented in several categories, but the most of his work was in the telegraph field. His name is probably best recognized today in connection with his main line sounders. They were designed to be used directly on long, main lines, without the need of relay.

Prior to Ghegan's innovation, sounders were typically placed in a local, battery-powered circuit and actuated from a relay in series with the main line. The new sounder design eliminated the relay and the local circuit, resulting in savings in both equipment and battery maintenance. The instrument had relay-sized magnets and gave an operator convenient and precise control of both the lever's spring tension and the air gap

between the armature and magnets. As with a relay, these controls were a necessity to compensate for any leakage along a line. An arrow on the air gap adjustment knob gave a visual reference of the armature's position relative to the magnets.

The sounder was also utilized as a portable instrument because of its ability to work with weak currents. Although today his dual control design is referred to as the "Ghegan Sounder," it was actually introduced by J.H. Bunnell & Co. in the spring of 1900 and, accordingly, named the MCM sounder (Fig. 1). It was widely used by Western Union and the Signal Corps.

When alternating current supply voltage became available in the early 1900s, Ghegan invented a number of telegraph instruments that worked on AC The elimination of the batteries in the local circuit and the trouble of maintaining them appealed to operators and managers alike. A photo of an AC sounder of his design appears with this article (Fig. 2).

It appears to be an ordinary aluminum lever sounder but, upon closer examination, you will notice that the magnets are displaced from their more traditional position. The instrument also uses a split-armature design, placing the fixed sections below the ends of the magnet's cores to eliminate chattering. This AC sounder was typically fed using a simple rc network that resulted in a operating current of about 30 mA.

Ghegan, who spent a good part of his early career trying to copy messages under a wide variety of line conditions, was constantly looking for new ways to precisely adjust the sensitivity of relay and sounder magnets. One of his inventions was a design to adjust an instrument magnetically instead of by physically varying an air gap.

On a typical relay, the air gap between the armature and magnets was adjusted by moving or racking the whole magnet assembly back and forth horizontally. In the Ghegan relay (Fig. 3), the magnets remained in a fixed position, along with the gap. The sensitivity was adjusted magnetically by varying the yoke's proximity to the ends of the magnet cores. A single-control sounder incorporating this design was officially called "The Ghegan Sounder."

Ghegan held several patents in multiplex telegraphy. His 1901 invention of a "Circuit Controller" was the basis for the Ghegan automatic repeater, which was used by The Postal Telegraph Co., The U.S. Signal Service, and many railroads. Using his talent to manipulate circuits magnetically, he superimposed an additional lever and armature on the transmitters in the repeater to create a time delay that was very beneficial when keying from one circuit to another under poor line conditions.

A familiar key among collectors and operators is the Bunnell Double Speed Key. The one pictured here (Fig. 4) is from the Lou Moreau collection *(Lou Moreau, now a "Silent Key," was a*

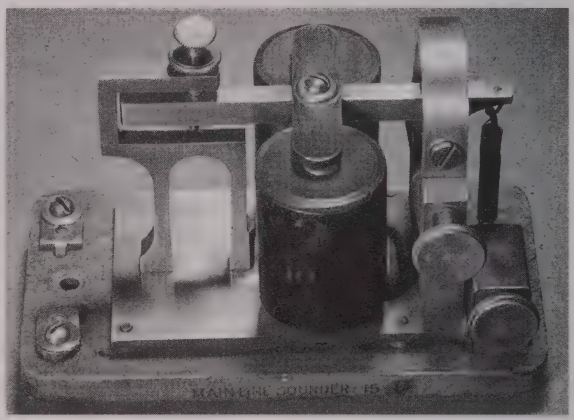

Fig. 1. The MCM Sounder, Author's Collection.

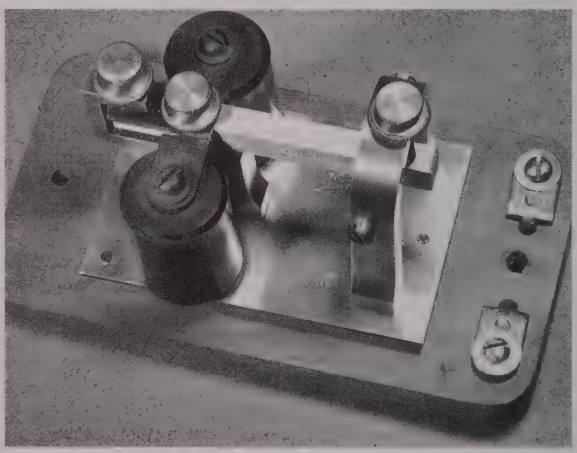

Fig. 2. Ghegan AC Sounder, Author's Collection.

distinguished key collector and the original editor of this column. Her extensive collection is housed in the Antique Wireless Association Museum.—mfe). Ghegan filed for a patent for this key in 1905. It has affectionately been labeled a "sideswiper" because it operated by the horizontal travel of the lever between two adjustable contacts. Even though it was a manual key, it was promoted as a solution for operators who suffered from forearm "cramp", and those who were afflicted would "soon recover" by using one.

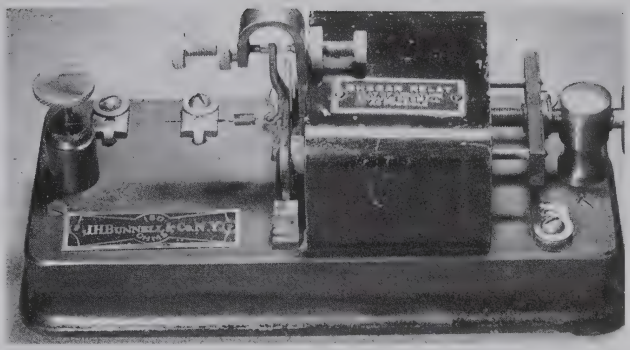

Fig. 3. The Ghegan Relay (yoke pulled back), Author's Collection.

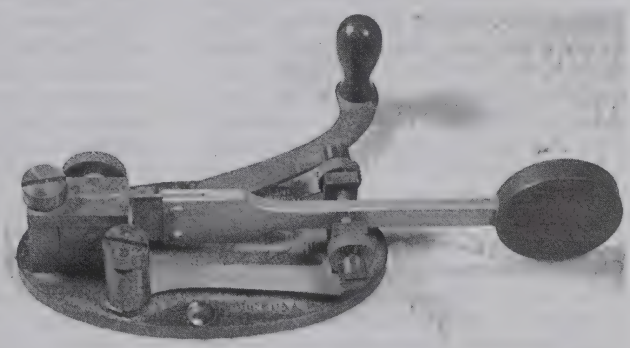

Fig. 4. The Bunnell Double-Speed Key, Lou Moreau Collection.

It is interesting that Ghegan made no claim to this possible benefit in his patent. His goal was only to produce a simple, cheap, and efficient telegraph key that operated horizontally. His patent shows the lever electrically isolated from the base and contacts supported by a block of ebonite-like material. In later styles, the contacts are isolated, and the lever is supported by a block of brass that is common with the base and circuit closer.

Also in 1905, he was concerned with designing keys that could be produced in large quantities for use on circuits having higher potentials. He filed for a patent to cover the manufacture of keys with moldable insulated bases and embedded conductors. Such keys would be simple in construction and adapted to being "expeditiously manufactured" at a small cost.

Ghegan originally filed for a patent for a transmitter, where "signals are automatically made by a vibrator set in motion by the operator" in 1913. Eleven 11 years later, when Ghegan was 73, he was granted a second patent improving the original design. The instrument was then marketed as the Bunnell Gold Bug. It was labeled "gold" due to the appearance of its brass lacquered base and parts. Early models had "J.H.Bunnell & Co." engraved on the lower left corner of the base. Later models had a "gold" Bunnell Gold Bug label attached.

An uncommon nickel plated version from the Lou Moreau collection is shown as Fig. 5. One of the unique design features was a supplemental leaf spring, attached to the back of the vibrating lever, containing a dot contact that reached through a hole in the lever. It is interesting that Ghegan felt that a fixed weight placed at the end of a long lever, "unencumbered by bars or sliding weights," was all that was necessary. However, as manufactured, the key had a sliding weight. It is well built and very handsome, but has received mixed reviews from operators who had Vibroplex experience to draw upon for a comparison.

A subtle Ghegan invention you may have seen on some learner's sets is the inclusion of three binding posts. These practice sets typically have the sounder and key on the same base. Ghegan's patent covers the ability to hook these sets up in either open- or closed-circuit configurations. In the open-circuit configuration (preferred for students), inexpensive dry cells could be used, and they were only needed when sending.

The uniqueness of Ghegan's design is that while saving on batteries when wired for an open

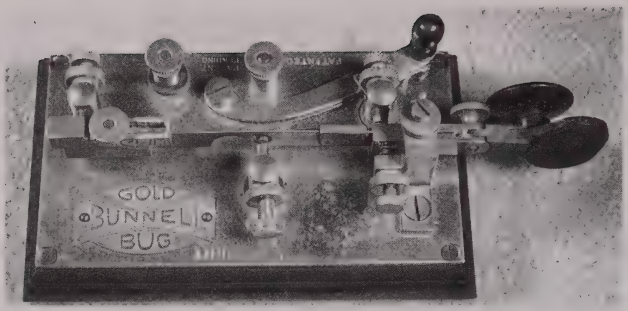

Fig. 5. The Bunnell Gold Bug, Lou Moreau Collection.

circuit, the student still needed to operate the key's circuit closing lever, just as if he were on a closed circuit. He was thus prepared to operate properly on the closed circuit system used in America.

Ghegan's Straight Line Radio key, derived from his 1915 patent, was intended for spark service, and designed to have adjustable and replaceable contacts. According to Ghegan, this would "obviate fading or variation in strength of signals due to varying resistance at the contacts."

The proper adjustment of these contacts kept the key's lever in its normal, horizontal (straight line) position regardless of contact wear. This provided full contact surface alignment for the life of the contacts. The same patent also covered the option of installing an auxiliary lever and contacts on the key for shunting a primary coil in the receiver.

During his 41-year career with J.H. Bunnell & Co., only three patents were filed as assignor to the company: The Ghegan sounder series (1900) and the three-terminal learner's set (1908). Some of his other inventions included a holder for crystal detectors, a method for variable grid leak control, and spring contacts for vacuum tube sockets. One of his first patents was for a magneto-electric liquid level indicator that used magnetic floats to control and monitor fluids. Thomas Edison used this indicator on three of his boilers in 1888, and sent Ghegan a personal note of appreciation.

In later years, John Ghegan spent his spare time perfecting his billiard game. A widower, he passed away alone at the age of 83. Although his name may not be as well known as that of other inventors in the field, examples of Ghegan's important innovations have always been sought-after key, telegraph, and wireless collectibles.

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Newark Sunday Call, July 1926, July 1928, March, 1933
Telegraph Age, January, 1908
East Orange Record, January 1935
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LETTERS, *continued from page 5*

"syntony" was of much importance in this event. Much in both transmitter and receiver was broadband; and I am advised (MacKeand, WA3ZKZ, private communication) that propagation conditions favored HF rather than MF.

DESMOND THACKERAY
Byfleet, Surrey UK

MORE ON USS LEARY RADIOS

Thanks for publishing the picture of me with the TBL (May, 2001 "Letters to the Editor"). It was taken as part of a plug for "a great future in Navy electronics."

I might mention that the receiver shown above the RAL in the article on the USS *Ling* in the February, 2001 "Below 535" column (p. 58 top) is an RBS made by Western Electric and covers the range (to the best of my recollection) of 2-20 MHz. We had one of these, along with the RAK and TBL mentioned in my previous letter, in the starboard emergency radio room of the USS *Leary.*

RODNEY K. SCHROCK, KD3OR
Somerset, PA

OOPS DEPARTMENT

The URL for the web page of Richardson Electronics in my article "Putting the Navy OS-8 To Work" (May, 2001 issue) has a typo. You printed it as "www.rel.com," but the correct address is "www.rell.com."

JOE STEPHANY
via e-mail

THE VACUUM TUBE

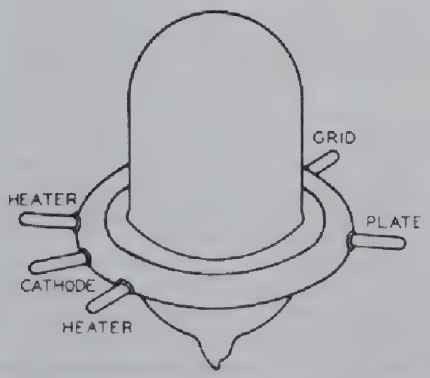
EDITED BY **LUDWELL A. SIBLEY**, 102 MCDONOUGH RD., GOLD HILL, OR 97525-9626

The Acorn Tube

Innovations in tube technology were often important at the time of introduction but faded into disuse after a few years. A vivid example of this effect is RCA's "acorn" tube design, which greatly eased the problem of building equipment for VHF and low-UHF frequencies during the late '30s and early '40s.

This unique design attacked the traditional limitations of tubes at high frequencies by shrinking the dimensions of the elements, adopting a relatively tiny all-glass bulb, and using thick radial element leads of unusually low inductance and capacitance. B.J. Thompson and G.M. Rose of RCA published articles describing an experimental triode and tetrode in 1933-34 [1, 2]. Development continued, yielding a tube in the form that we recognize as the "acorn" [3]. It, and Bell Labs' "doorknob" tube, were the first U.S. physical designs to break free of the "light-bulb" origins of the vacuum tube.

The first commercial tube in the line, and the most important by far, was the 955 triode, announced in March 1935. It was promoted as usable up to 500 MHz. RCA sold it initially under the "RCA-DeForest" brand, which it was then using for amateur-market transmitting tubes and CRTs. The earliest tubes have a rounded dome, more nutlike than the squared-off bulbs of later production. The 955 was accompanied by the 954 sharp-cutoff pentode. The 956, a 954 with new grid to give remote-cutoff action, arrived in 1936. These were 6.3-volt heater-type designs, with the pentodes having top and bottom pins for grid and plate.



Drawing of original domed version of the 955 triode. Tube measured 1⅜" from top to bottom.

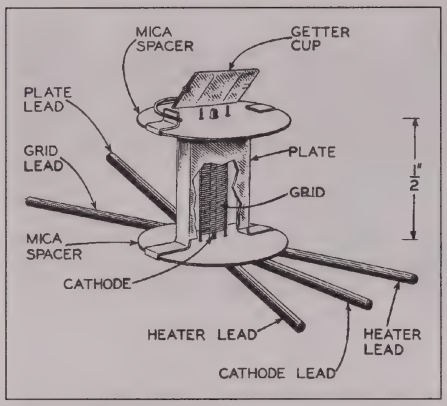
They were followed by a group of 1.4-volt types for battery-powered use: the 957 receiving triode, 958 transmitting triode, and 959 remote-cutoff pentode. The 958 had dual paralleled filaments for increased emission [4].

There was also a mysterious 953. NAVSHIPS 900,119 [5], that rich source of half-information on tubes, terms it an "Australian acorn type." Digging through the Dowd-RCA archive reveals a developmental type R6048, tentatively coded "953" at the time, from about 1937. It was a diode with a plate pin on the bulb top. It never reached commercial status in the U. S., but the (Canadian) "Westinghouse No. 10" of WW II was essentially an R6048 with a different getter. The 6048, AKA "CW10," was used in the I-242 power meter for the Canadian-built SCR-602 radar.

Two more diodes were added to the line for WW II military equipment: the 9004 and 9005. The 9004 was basically a 953 without a separate plate pin, for use in radar altimeters. To aid in matching pairs of 9004s, each tube carried a "zone" number, 1 through 6, stamped at the top of the bulb to indicate its relative emission under test conditions. The 9005 had a remarkably tiny mount, placed sidewise among the pins, and a 3.6-volt heater. (The mount was moved to the usual vertical position in '50s production.)

In 1942 the 958 received tighter controls on emission and became the 958A. This was in response to a report from the Navy that, in one of their transmitters—possibly an early model of the TBY—the tube kept oscillating even after filament power was turned off. Filaments with unusually high emission could keep going, heated only by the plate current.

The line was expanded during the war to in-



Internal construction of the 955 triode.

clude the 6F4 and 6L4 triodes. The 6F4 had dual grid and plate pins (seven in all) for lower inductance, and was able to oscillate up to 1200 MHz. Repackaged later, it yielded the miniature 6AF4 of UHF-TV fame. The 6L4 was a 6F4 with lower capacitances and higher amplification factor. There was to have been a pulse-rated 6Q4 for a Navy project, but it was never introduced. The type designation "6Q4" was reused for a postwar miniature type.

RCA also produced the 1650, a 955 with modified heater and cathode to prevent interelectrode leakage, for use in the Boonton Radio VHF Q-meter. After the war it briefly offered the 5731 (a 955 selected for use in Signal Corps balloon-borne radiosondes).

It's not obvious to the casual observer, but the radial pins on these tubes started out as a group of Dumet rods that were welded to a metal ring. This held the rods rigidly in place as the tube mount was spot-welded to them. After the top and bottom halves of the bulb were sealed to the rods, the rods were cut loose from the ring and tinned.

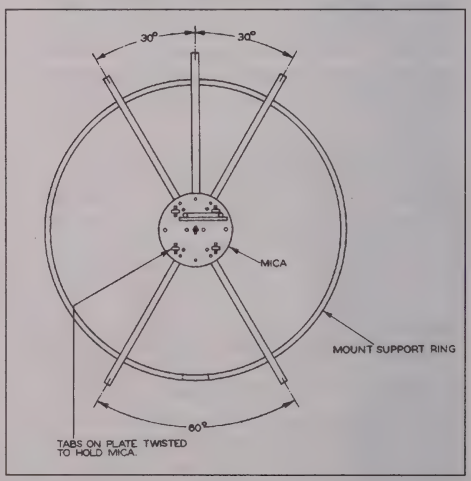
While these tubes were nominally VHF types, their small size had an appeal of its own. In the '30s, RCA Victor sold a relatively tiny crystal frequency-calibrator using a 955, and a beat-frequency audio oscillator using 954s and 955s. There was at least one construction article on building a broadcast remote console with 955s.

Acorn tubes appeared in the front ends of well known prewar and wartime VHF receivers like the Hallicrafters S-27, S-36, and S-37, and the National 1-10. They served as probe tubes in vacuum-tube voltmeters, and in numerous VHF signal and sweep generators like the Measurements 80, the Ferris 18-series Microvolters, and the General Radio 804. Postwar, they appeared in the Abbott TR-4B two-meter transceiver and the Stewart-Warner "Portaphone" transceiver for the now-forgotten 460-MHz Citizens' Band.

Apart from their "niche" use in civilian equipment, these tubes played an immense role in military gear designed just before and early in WW II. Table 1 shows some U. S. equipment that relied on "acorns" in their RF sections. In most of these sets the tubes ran at 100 to 250 MHz, reasonable frequencies considering their capabilities, but in the BC-645 and ASB they were pushed to 500 MHz. Later ASB models used lighthouse tubes instead, but that's another story.

It wasn't just American gear that included acorns: UN-955s made by Hitachi served in the receivers of Japanese VHF radars, and some German radars made by GEMA used Philips and Valvo acorns. The British, although having good VHF-UHF tubes of their own design, made some use of acorn types like the ZA2.

Several U.S. manufacturers made acorn types, particularly 955s, during WW II. As a result, most tubes found today are ex-military, and carry Joint Army-Navy (JAN) designations in either a long form or an abbreviated version ahead of the tube type number. The known makers are: GE (JAN-CG or JG); Hytron (JAN-CHY or JHY); Raytheon (JAN-CRP or JRP); RCA (JAN-CRC or JRC); Sonotone (JAN-COZ or JOZ); Tung-Sol (JAN-CTL or JTL); Westinghouse (JAN-CWL or JWL).



The Dumet rods that would become contact pins were temporarily welded to metal support ring during construction of tube (see text).

Table 1 - Military Gear Using Acorns

Radar receivers
ASB-4, -5
BC-404 (SCR-270)
BC-406 (SCR-268)
BC-618 (SCR-516)
BC-701A (SCR-521A)
BC-1082 (SCR-602-T1)
BC-1121(SCR-588B)
R-36/TPS-2

IFF transponders
ABA / BC-645

IFF interrogators
BC-663 (SCR-533)
BC-1068
BN, BP
RT-48/TPX-1

Search and intercept receivers
BC-787
BC-1269
R-44/ARR-5
R-593/GR
RDC
TU-57A (SCR-587)
TN-17, -18/APR-4

Radar altimeters
BC-688 (SCR-518A)
RT-7/APN-1

Glide-slope receivers
R-15, -57/ARN-5

Test sets
BC-761 (I-109)
I-86 (IE-55)
I-161 (IE-21)
TS-24/ARR-1
TS-54/AP

Miscellaneous
BC-655 target transmitter
BC-790 (RC-110) radar trainer
BC-800A (SCR-729) radar beacon
BC-1212 (SCR-549)
TV-guided-bomb transmitter
I-237 TV-guided-bomb test set
R-1/ARR-1 (ZB) homing adapter
R-17A/FMQ-1 radiosonde receiver
RT-1/APN-2 radar-beacon interrogator
RT-3A/ARN-1 navigation aid
TBS shipboard receiver
TBY backpack transceiver

Table 2 - Identifying RCA Acorns

Five radial pins, no pin out top or bottom.
- black plate: 955
- black plate, with white ink dot on bulb above center of wide-spaced pins: 1650
- "7" molded in top of bulb: 957
- "8" molded in top of bulb: 958
- tiny nickel plate, in plane of pins or vertical: 9005
- white dot on top of bulb: 5731
- "Zone" 1 to 6 stamped atop bulb: 9004

Five radial pins, plus pin out top.
- Westinghouse No. 10

Five radial pins, plus pins out top and bottom.
- Black plate: 954
- Black plate, with small white ink dot on narrow side of plate: 956
- Nickel plate: 959

Seven radial pins, no pin out top or bottom.
- Black plate: 6F4
- "L" marked atop bulb: 6L4
- "Q" marked atop bulb: 6Q4

"GE" 955s are found with either a GE date code, or an RCA code suggesting purchased product. One Tung-Sol 955 inspected was coded with the "MR" symbol, for civilian "maintenance and repair" use!

Many of these tubes are marked in simple white ink, which has been rubbed off over the years. Fortunately, details of construction are quite helpful in sorting acorns out. Table 2 has been developed from an RCA internal aid in the Dowd archive.

The 954, 955, and 956 were repackaged in miniature form as the 9001, 9002, and 9003 respectively. This should be useful to anyone who wants to build a socket adapter to test acorns, and who needs the settings for the tester: just use the test data for bias and plate load from the corresponding 900x tube.

The acorn line served valiantly until better VHF/UHF tubes came on the scene ca. 1941, then abruptly dropped out of new equipment designs. That gave a product life of only about six years. In future articles we will address some of the new contenders.

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1. B. J. Thompson and G. M. Rose, Jr., "Vacuum Tubes of Small Dimensions for Use at Extremely High Frequencies," *Proc. IRE*, Dec. 1933, pp. 1707-1721.
2. B. J. Thompson, "Tubes To Fit the Wavelength," *Electronics*, Aug. 1934, pp. 214-215.
3. B. Salzberg, "Design and Use of 'Acorn' Tubes," *Electronics*, Sept. 1934, pp. 282-283,

292.
4. L. G. Pacent, "Acorn Tube Technics," *Electronic Industries*, Sept. 1944.
5. "Cross Index of Electron Tube Types," *NAVSHIPS 900,119*, 4th ed., Bureau of Ships, Navy Dept., April 1946.

Jack A. McCullough, Sr., a cofounder of tube maker Eitel-McCullough Inc., died April 28 at the age of 93. He was born in 1907 in San Francisco, California, received the amateur call-sign 6CHE, ca. 1924, and attended college for two years. He joined the tube-and equipment-maker Heintz & Kaufman in January 1930, shortly after H & K hired his future partner Bill Eitel, W6UF.

At H & K, he pumped, sealed and tested transmitting tubes. He and Eitel left H & K in 1934 to form Eimac after the firm's decision not to sell actively to the amateur market. The new company introduced a line of innovative power triodes, starting with the 150T. "Bill and Jack" are shown as co-inventors on most of Eimac's patent portfolio in the early years.

During WW II, the company massively increased production of its power triodes. After reconverting the company to civilian tube production, Eimac expanded into microwave power tubes. Eitel and McCullough sold control of the company to Varian Associates in 1965 but remained as officers into the '70s.

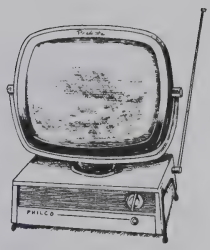
Jack McCullough, W6CHE

McCullough was an enthusiastic radio amateur, holding the W6CHE call-sign for 70+ years. He was active in high- frequency DX work, earth-moon-earth communication, and satellite relaying.

The U. S. Navy gave him its Distinguished Public Service Award in 1950. He was elected as a Fellow of the Institute of Radio Engineers in 1953 for "pioneering contributions to power tube design." He became a Fellow of the Radio Club of America, receiving its Ralph Batcher Award in 1979 and its Sarnoff Citation in 1994. He was an active contributor to Stanford University, where the new McCullough Engineering Building honors him.—*las*

TELEVISION

EDITED BY **RICHARD BREWSTER**, 145 LITTLE PECONIC BAY ROAD, CUTCHOGUE, NY 11935 *PLEASE INCLUDE SASE FOR REPLY.*



Adventures of a TV Serviceman—Part 2

I first met Art Kingsley in 1971, shortly after my move to New York. We soon became close friends due to our mutual interest in the antique radio hobby. Often I had suggested that Art let me publish his early TV service stories, especially since he had worked in the business ever since television had just begun to get off the ground in 1946. Part 1 of his remembrances of those early years appeared in the previous issue. Here is the Part 2, the conclusion.

Interference (continued)

Intense interference could often be caused by other sets radiating their local oscillator signals back up into the antenna. This would happen if the set didn't have an RF amplifier stage ahead of the mixer. It would cause the picture on neighboring sets to turn negative. The worst offenders were pre-war sets like the TRK9 and 12. In some locations neighbors would actually get together and buy the owners of the offending sets modern TVs.

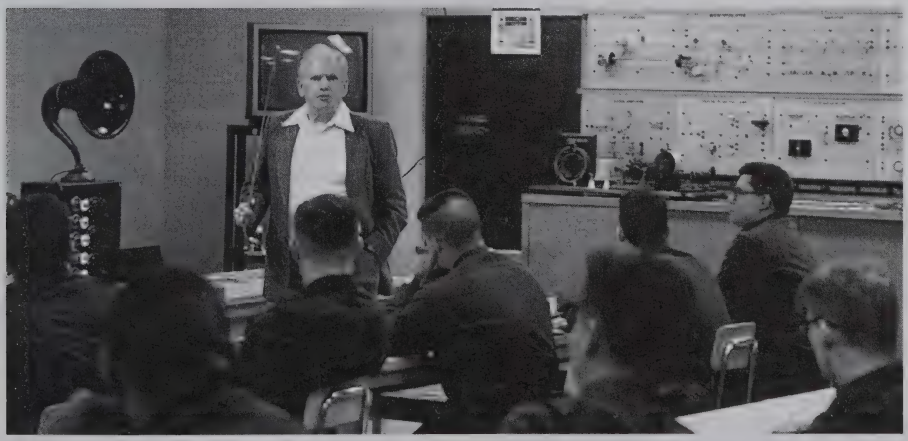
The New York State Thruway and Route 84 hadn't been built yet, so all major traffic was carried by route 9W. There were many traffic lights on this road and when traffic stopped, nearby TV reception suffered terribly. The sync circuits on most of the early sets were very unstable, even under the best conditions, but when tripped by ignition noise, they were impossible.

Art points out that "With all the limitations of these early sets, the early transmitters left a lot to be desired." In Newburgh at that time there were only three stations on the air; NBC on channel 4, CBS on channel 2, and WABD on channel 5. Though NBC had its antenna on the Empire State Building, its power was minimal.

Video Peaking the 630

During the early days of TV, the big excitement was the Friday night fights. This was a bonanza for the local bars. Since not many people had sets yet, crowds filled the popular watering holes to catch the show. Many of these bars were located in less than favorable reception locations.

"In really bad spots," says Art, "I would take an RCA 630 and 'peak the devil' out of the video IFs so that some semblance of TV reception could be enjoyed. Of course the picture quality was awful, but it was at least a picture. And it helped that the sets were elevated to the



Art lecturing to cadets at West Point.

highest point at the bar. Peaking the video IFs caused great difficulty in getting decent sound, but by careful adjustment of the converter in the front end, I made it barely acceptable."

Tube Count

Early TV sets had a lot of tubes. For instance, the RCA 630 had 31 tubes and most sets averaged 20 to 25. And yet there were sets with fewer than 15 that still worked acceptably. Art recalls that, "One of these sets that comes to mind was a set sold by an individual who called himself 'Madman Muntz.' In fringe areas where high tube count usually resulted in better reception, this set had the lowest tube count I had ever seen. Also there was no power transformer! But the strangest part of all was the fact that the set worked fairly well.

Other low-tube-count sets, such as TeleKing and Olympic, were also on the market. TV viewers of those days were not as sophisticated as they are today, so picture quality was no big deal. Price was very important and these cheap sets did work after a fashion.

Many stores had self-service tube testers that allowed the TV owner to check his own tubes. At that time there were at least 100 TV repairmen in Newburg; now there may be only two or three! "Today's solid state equipment is so reliable that we forget how many service calls it took to keep the old b&w sets working."

Zenith Remote Control

Zenith was one of the first manufacturers to offer remote control. The remote was a flashlight-like device which illuminated photo-cells at the corners of the CRT. It worked great except at night when thunderstorms erupted. Then the sets would turn on and off, change channels, adjust the sound, etc. at every lightning flash!

Projection Sets

RCA and Philco pioneered in the introduction of projection sets. Both used similar systems, which included a five inch CRT with spherical mirrors and correction lenses. Unfortunately burns quickly developed on the CRTs, which made for a dark picture.

Then Fada came along with a system called "Protelgram," which used a new 3-inch CRT made by Norelco. This CRT also eventually developed burns, but at a much slower rate. "One of the great problems of projection TV time was that if the sweep was lost, even for an instant, a permanent burn spot was the result."

Antenna Installations

Since this was a deep fringe area with weak and noisy signals, the picture was only as good as the antenna. In many cases the TV might cost $500, but the antenna could cost three or four thousand (1950) dollars! Towers were the norm; some as high as 200 feet. One type of antenna was a "4 bay conical." It was not unusual to have a separate Yagi antenna with its own mast-mounted four-tube booster for each channel.

Art installed this 95-foot antenna mast atop a 3-story building in 1950. All antennas are 12-element yagis. The signal fed 95 homes.

Some of these early antennas were monstrous affairs. Art explains that, "One was a '4-bay lazy H' antenna, cut for channels 2 through 5, manufactured by 'Vee Dex.' The cross members consisted of cast aluminum trusses that occupied 15 feet of space supported by a 3-inch pipe! The first set of guy wires had to be mounted under this monster." The same company also made a large chimney mount that was designed to be jammed inside very large chimneys.

Installing antennas during this period was made more difficult by insurance constraints. All guy hooks had to be mounted off the roof proper. Mounts consisted of 3 pieces of 2×4 put together to form a saddle over the peak of the roof. Art did all of his thousands of installations alone, working up into the mid 1970s!

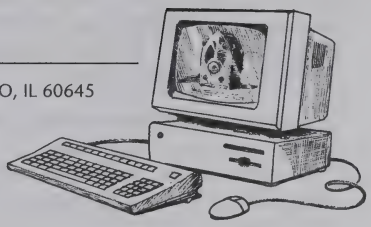
Often antenna systems would develop resonances and vibrate through the whole house, particularly in the winter when the guy wires tightened up. Sometimes woodpeckers would go to work on the elements, setting up a racket that could be heard for blocks around!

Art relates that, "As part of the equipment carried on the truck, we had a telescopic 60' tower that we used to make signal surveys at a customer's home. We charged $25 for this service, but if they bought a set and antenna, the service

(continued on page 28)

ON THE INTERNET

EDITED BY **CHUCK SCHWARK**, 7454 N. CAMPBELL AVE., CHICAGO, IL 60645
PLEASE INCLUDE SASE FOR REPLY. E-MAIL: caschwark@aol.com



Old Timer's Groups on the Web

Over the past few weeks, while fishing around in my brain for a topic for this installment, a few individuals have kindly submitted links to the websites of other wireless (and related) groups for me to mention in my next column. Between these submissions and my knocking about on the Web, I've come up with a number of very good sites dealing with amateur radio groups, historical compilations, and information on early inventors and pioneers in the wireless field. I even learned a few things! These links are below, along with a short quote about the content or purpose of each one. Some of the links are now on the AWA web site links page as well. These sites deserve a good look.

The Oklahoma Vintage Radio Collectors (OKVRC)

http://members.home.net/okvrc/

The Oklahoma Vintage Radio Collectors Club promotes the preservation of the history, technology, and equipment of the early days of radio broadcasting and communications.

Holmes C. Miller Historical Site

http://userwww.sfsu.edu/~hl/holmesmiller.html

Mr. Holmes C. Miller, his company, his radios and other products. To date, the only advertisement of his I have found is in the December 1930 issue of *QST* magazine. [Website author is looking for more info.—C.S.]

Quarter Century Wireless Assn. Inc.

http://www.teleport.com/~qcwa

The Quarter Century Wireless Association was organized to promote friendship and cooperation among Amateur Radio operators who were licensed at least a quarter century ago. More than 30,000 membership numbers have been assigned over the years by Headquarters. Although the majority of these amateurs live in the United States, the membership stretches world wide.

Stoddart Aircraft Radio Company History

http://userwww.sfsu.edu/~hl/src.html

Research is a category that has been neglected, yet vital to the history of radio communications. This category would include those state-of-the-art, laboratory radio receivers designed for scientists and engineers in scientific studies of man-made, narrowband RF signals; naturally-occurring, broadband RF energy; communications surveillance and spectrum signature plotting; EMF field intensity and radio interference; and antenna propagation surveys and measurements. No company better represents this category than the Stoddart Aircraft Radio Company of Hollywood, California. It was founded by pioneer radio engineer, Richard R. Stoddart.

Harvey Radio Labs

http://www.swedeart.com/harvey/index.html

Welcome to the Harvey Radio Labs virtual museum! This is a site in memory of Mr. Clifford A. Harvey, W1RF and his Harvey Radio Labs. The long forgotten company that made one of the best transmitters before and after the war.

The Society of Wireless Pioneers, Inc.

http://www.sowp.org/

The Society of Wireless Pioneers (SOWP) is dedicated to the collection and preservation of

the history of communications, particularly wireless and radio telegraphy. SOWP is also a strong influence against efforts to eradicate CW as a mode of communications.

Stereophonic Audio, Its Commercial Beginning
http://userwww.sfsu.edu/~hl/s.html

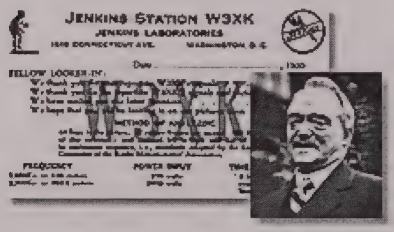
Includes Cook Binaural LP Disc and Binaural Phonograph Adapter and Magnecord Binaural tape transport and amplifier.

Veteran Wireless Operators Association
http://www.vwoa.org/

The Veteran Wireless Operators Association was founded in 1925 to foster fellowship among the wireless operators aboard ship, in the military, and in the shore stations. Over the years the ranks of the VWOA have included most of the executives and innovators of the broadcasting and communication industry, as well as thousands of radio operators.

America's First Television Station, W3XK
http://userwww.sfsu.edu/~hl/cfj/cfj.W3XK.html

A scrapbook of postcards, letters, and QSL cards collected by station owner, Charles Francis Jenkins. He was a prolific inventor who achieved over 400 patents, including 75 devoted just to mechanical television.



TV SERVICEMAN, *cont. from page 26*

would be free. I also used this tower as a 'gin pole' to help me raise 100' towers. There was lots of excitement during these adventures; once the truck nearly turned over!"

Art explains that, "We never used chimney mounts, never used aluminum masts, only galvanized water pipe; heavy but extremely durable. Years after I first installed these antennas, I would go back and climb these masts, sit on the guy ring and change the guys and lead-in. Due to their great strength and durability, climbing them was easier than dropping them. Not only would I do this with 21 footers but with the 40 footers as well...I must have been nuts. Ice and snow were another story; the deeper the snow, the safer it was. Thin icy stuff was very dangerous."

Wrong House

Art was given instructions to install a 21' antenna on a house in Mountainville, a small village just to the south of Newburgh. This house was one in a row of similar "mill" houses...all nearly identical. Art relates, "I was to install it on the fourth house from the south end of the street and the people were not going to be home. While I worked there that day, a gentleman came out and engaged me in lively conversation; never letting me know that I was at the wrong house. No problem.

The next day, when I went to deliver the set, I found out that the antenna was on the wrong house. When I started to take the ladder off the truck, the same gentleman showed up and said that if I put the ladder up against the house, he would have me arrested. The wrong house was his and so now was the newly installed antenna. Obviously, I had to install another antenna at the correct house! This bothered me at first but later I saw the humor in it and to this day it still gives me a chuckle."

Post Script

In 1962, Art went to work for the Department of Electrical Engineering at West Point Military Academy. There he built, and sometimes designed as well, countless teaching display models for use in engineering lectures. Sometimes he actually conducted the lectures! He retired in 1983 to work full time on his antique radios. Art has restored many sets and built a fine museum at his home, where he displays all the significant sets of the early radio years: AK, Federal, Kennedy, Radiola, etc. He is a member of AWA (since Canandaigua years), HARPS, NJARC, and was a member of the old ARCA.

New Books and Literature

EDITED BY **DAVID W. KRAEUTER**, 506 E. WHEELING ST., WASHINGTON, PA 15301 E-MAIL kraeuter@sgi.net
PLEASE INCLUDE SASE FOR REPLY.

Books to be reviewed in this column should be sent directly to David Kraeuter at the address above. After review, all books become a permanent part of The AWA Library, which is located in The AWA Electronic Communication Museum and is open to members for browsing and research.

The Complete Price Guide to Antique Radios: The Sears Silvertone Catalogs 1930-1942

By Mark V. Stein. Published 2001 by Radiomania Books, 2109 Carterdale Road, Baltimore, MD 21209. E-mail rpbook@bellatlantic.net. 8½ by 11 inches, 239 pages, soft cover. $34.95.

The book consists almost entirely of full-size reproductions of the radio pages of Sears catalogs from 1930 through 1941. Note that the title can be misinterpreted—detailed coverage does not include 1942. This is the latest in a series of price guides by the publisher, earlier guides including pre-war consoles and three volumes of tabletop radios. Suggested current values for each set are included in an eight-page table at the back of the book, but this is not the most valuable information provided. One suspects the price guide (so prominent in the book's title) may have been included to enhance book sales. A manufacturer source code table rounds out the book. It identifies, from the chassis number, which company made any specific set for Sears. About 35 companies are listed.

The real value of the book lies in the unstated sociological, historical and economic lessons provided. Here is a subtle picture of several aspects of American life in the years of the Great Depression, particularly life on the farm. In 1935, the year in which the Rural Electrification Administration was established, only about 10% of U.S. farms had electricity. For that reason a large number of the radios covered here are battery-powered, including a surprising number manufactured in 1941.

Batteries and their foibles, particularly periodic charging of "A" batteries, must have generated a lot of talk among the owners of these radios. No one wants to transport heavy batteries to be re-charged, but this was done on a regular basis. Sears also sold several devices for home charging by the farm set owner. One of the more interesting of these was the Silvertone Air-Charger, a wind-driven propeller-generator combination designed to be mounted on a rooftop. It required an average wind velocity of 8 to 12 miles per hour to effectively keep a 6-volt storage battery charged. If you lacked adequate wind power, perhaps you needed the Gas-O-Power gasoline-operated self-starting battery charger. This was itself started by a 6-volt storage battery.

By the late 1930s Sears was offering radios powered by just one battery. These contained vibrator-operated power supplies, just like in the car radios that we hated to service in the 1950s. As early as 1933 Sears was offering a car radio, and that catalog also boasts the "newest thing in radio," a Silvertone portable. The smiling, slender young woman pictured carrying one of these radios appears not to notice that it weighs "only" 32 pounds.

By 1937 Sears had discovered advertising testimonials. So we have pictures of Mr. Chester E. Nowell of Georgia, Mrs. Steve Polasek of Ohio and Mr. H. W. Adams of Delaware, each singing the praises of their Sears radio. We are assured that their letters are on file in Sears offices. We know roughly where these people lived, but just what motivated them to write? By 1941 Mr. J. L. Hammond (pictured in bib overalls) of Sanford, Maine gives us about 250 words of praise for his Sears set. Were these testimonials genuine, contrived or somewhere in between?

I have never seen a Sears radio that I found pleasing to the eye, and I wonder if this aspect of their design was ever addressed by the company. Perhaps the way the set looked was thought to be last in the mind of the consumer, or, as was recently suggested to me, perhaps Sears may have been deliberately trying not to offend the aesthetic sense of its customers. We may never know.

This will be a must-have book for Sears collectors and enthusiasts, but others will also be able to appreciate the rich detail and nostalgic takes presented here by the dozens.

♦♦♦♦

The following review of a book written by

columnist Kraeuter himself has been prepared by the OTB *Editor:*

Radio Patent Lists and Index 1830-1980

By David W. Kraeuter. ISBN 0-7734-7520-6. Published 2001 by The Edwin Mellen Press, 415 Ridge St., Lewiston, NY 14092. E-mail cs@wzrd.com. 6 by 9 inches, 608 pages, hard cover. $129.95.

This is obviously a book that any serious electronic communications researcher *must* have. The work constitutes nothing less than a complete listing of U.S. and British patents for each of 100 key inventors in the period from 1830 to 1980. All of the individual's patents are included whether they relate to electronic communications or not.

In selecting the list of inventors to be cited, the author has tried to include every name that might appear on anybody's "top ten" list. Two exceptions are Edison and Tesla, whose complete patent lists have been published elsewhere. A few relatively unknown inventors, whose names nevertheless often come up in discussions of telecommunications history, are also included, among them Loomis, Murgas and Stubblefield. Though the emphasis is on radio and television communication, the range of years selected begins early enough to allow the author to include inventors whose early work in electricity paved the way for radio's birth.

The no-nonsense production style of this volume belies its great importance as a reference source. You'll find no fancy graphics, thumbnail biographies, or other embellishments. Paper and typography are strictly utilitarian and the volume comes in a plain cloth binding with no dust jacket.

The organization of the book is as simple as its production style. At the front is an alphabetical list of the inventors covered, along with the dates of their lives and their first and last patents. Next follows the patent listing for each of the inventors included. The lists include each patent title, number, and date.

The book closes with an extensive keyword listing of all patents included, allowing the researcher to look up patents by title and/or content instead of under the inventor's name. Besides the convenience it offers, this listing provides important insights not only into how some inventors built upon the work of others but also how parallel innovations were often made concurrently by different individuals.

♦♦♦♦

The Collector's Vacuum Tube Handbook. Volume 1: The Non-RMA Numbered Receiving Tubes

By Robert T. Millard. Published August 2001 by Sonoran Publishing, LLC, Chandler, AZ 85226. 8½ by 11 inches, 196 pages, softcover, $25.95.

One is immediately struck by the clear, logical layout of this book. For most tubes covered there is a photograph of the tube and of a typical tube carton, a base diagram, a brief historical paragraph (which often indicates the rarity of the tube), and a table of maximum ratings and another of typical operation figures. Most data have been taken from manufacturers' sheets or tube manuals, but when no data could be found in some cases the author generated it using an AVO Mark IV dynamic mutual conductance tube tester.

Presumably future volumes in this series will cover tubes with RMA (Radio Manufacturers Association) numbers. Lack of standardization in tube numbering can obviously lead to confusion or worse. The author points out that although most O1As are interchangeable, an RCA UX 222, Sylvania UY 222 and an Arcturus AC 22 are radically different tubes. We are reminded here of the old adage about standards—the nice thing about them is that there are so many to choose from.

Even if you don't need the technical statistics provided, you may still want a copy for the interesting tidbits found in the historical descriptions. This may include tube function, manufacturer's name, date of introduction, reason for new type, complementary and competitive types, envelope type, time period during which the tube was popular, reason for demise, substitutions for type, and whether the tube had any unusual features, such as double filaments, use of screen plates, etc. The book includes a short but appropriate bibliography and an index by tube number.

Most tube collectors and tube historians will want to own a copy of this first-rate reference book. *Note: published book not seen by reviewer.*

OLDIES BUT GOODIES

The following reviews by Dave Krauter are of older books that have never before been reviewed in this publication. All of them originally appeared in The Pittsburgh Oscillator, *newsletter of the Pittsburgh Antique Radio Society.*

♦♦♦♦

Edison: Inventing the Century

By Neil Baldwin. Published 1995 by Hyperion. Out of print. Published 2001 by University of

Chicago Press. Soft cover. $18.00.

This well-written and thoroughly researched biography contains little about Edison's radio activities, but radio enthusiasts will still find it interesting for its coverage of Edison's related work in DC generation and distribution, electric lighting, the phonograph, etc.

Having invented and promoted his system of direct current power distribution Edison was considerably opposed to the idea of alternating current distribution, particularly the Westinghouse AC system. Here Edison slipped into outright ghoulishness:

In the courtyard of the West Orange laboratory, media-event public executions of animals by alternating current were conducted, escalating from dogs ("criticized because the weight of the animal killed was less than that of a man") to calves to horses. Edison's attorneys Eaton and Lewis suggested in all seriousness that recommended terms for this method (which included "ampermort," "dynamort," and "electromort") were inaccurate in their derivation: "Electricide" seemed more fitting, expressing direct analogies in the English language with "homicide" and "suicide."

But perhaps the best choice of all was to invent a new verb, to "Westinghouse." "As Westinghouse's dynamo is going to be used for the purpose of executing criminals," Edison's cunning men reasoned, "why not give him the benefit of this fact in the minds of the public, and speak hereafter of a criminal as being 'westinghoused,' or (to use it as a noun) as having been condemned to the westinghouse, in the same way that Dr. Guillotine's name was forever immortalized in France?" (page 202).

Edison may have had his blind spots, but he was almost continually inventing, and patented over a thousand devices in his lifetime. Among these was his three-story cement house, which he designed and built in an attempt to provide cheap ($1,200) housing for the masses. A mold of 500 cast iron sections was bolted together on top of a concrete footing. Then, over a six-hour period, wet cement was poured into a funnel opening on the roof until the mold was filled. Four days later the mold was removed and the cement house required only windows and doors to be added. Ten such houses still stand today.

In his final years Edison's passion was the production of rubber from native American plants. He succeeded in producing 100 pounds of rubber from an acre of goldenrod.

It could easily be argued that Edison invented the first radio tube (U.S. patent 307,031 for an electrical indicator), but he found no practical use for the device in radio. And he very reluctantly permitted his sons to get into radio manufacturing, which they did by merging with Splitdorf Radio around 1929. Baldwin writes: "Despite the [Edison] brothers' alacrity, the new Edison Light-O-Matic radio in its big, ornately carved cabinet was born as a $1,000 dinosaur compared to the versatile "little boxes" that were now invading American homes. The Edison radio was an eventual loser, surviving on the market for only eighteen months." (pages 388-9; see also Douglas' *Radio Manufacturers of the 1920s*, volume 3, pages 125-133).

[Originally in The Pittsburgh Oscillator*, volume 10, number 3, September 1995, page 17.]*

♦♦♦♦

Wireless Radio: A Brief History

By Lewis Coe. Published 1996 by McFarland & Company, Inc., P.O. Box 611, Jefferson, NC 28640, tel. 800-253-2187. 204 pages, hard cover. $30.00.

The usual chapters about KDKA, crystal sets, and antique radio collecting are here, but the real value of this slender book lies in the extensive survey the author has made of all major uses of radio. The survey ranges across "the Vast Continent" (William Crookes' phrase for the radio spectrum) and from the life of James Clerk Maxwell into the 1990s. So we also have chapters on marine radio (the first practical use of radio), amateur radio, point to point, military radio, radar, police radio, television, cellular and satellite telephones, portable radio, the attempt to transmit power via radio, etc.

Here are clear, though necessarily brief, descriptions of Ampex video recorders, the DEW line, diathermy, ELTs, Globalstar, GMDSS, INMARSAT, Loral, LORAN, microwave ovens, MSAT, NAA, OMEGA, Qualcomm Sincgars radio, Very Long Base Array, etc. Pitcher Nolan Ryan even gets into the act in a discussion of the use of radar in sports.

Most readers will probably recognize at least some of these topics. Coe, born in 1911, points out that he lived through the development of most of them, and he took many of the photographs included in the book.

Do you think you know what's happening in radio? Consider this: a Boeing E6A or Lockheed EC-1300 takes off carrying with it a coil of wire weighing almost a ton. Aloft, the wire is trailed out behind the plane for about five miles. "When the aircraft supporting the wire flies in a tight circle, the wire tends to assume a near vertical position that is essential for best results." This

(continued on page 32)

MICS AND MEN

EDITED BY **GEORGE A. FREEMAN**, 102 E. MAIN ST., MADISON, IN 47250-3411.
PHONE (812) 265-6878. E-MAIL RALOGEUM@AOL.COM. *PLEASE INCLUDE SASE FOR REPLY.*

The Mic: Western Electric 600-A
The Man: Charlie Stookey

Charlie Stookey had a following. Hundreds of thousands of radio listeners enjoyed his entertainment and farm broadcasting. Sponsors followed him from station to station and market to market: From WLS, Chicago to a brief stint probably at KMA Shenandoah, IA; then to St. Louis and stations KMOX, KWK, KXOK and WEW. At one point he did farm shows on the CBS radio network. He also was a newspaper columnist in St. Louis.

Embro Popcorn was one of Charlie's loyal backers. Stookey would put on a batch of popcorn in the studio just before air time for Embro's radio commercial. Just as he opened the mic, the butter, salt, and corn reached cooking temperature. During the live commercial, listeners were tantalized with his description of Embro's products accompanied by the percussion of popping corn! (From a 2000 interview with Charlie's son, Chuck.)

Stookey's often outstanding broadcast career spanned the period from approximately 1927 to 1952. It is highly unusual to have loyal sponsor support for an individual personality such as Charlie's. Sponsors usually buy the radio station, not the station's talent.

The mic pictured with Charlie, bearing the KWK flag, appears to be a Western Electric 600-A. That model was as good as a carbon mic could get. A top performer in the 1920s, it was outmoded by the time this picture was taken in the 30s. Notice it is missing most of its metal springs. In fact, rubber bands appear to be used as substitutes.

Charlie Stookey at the KWK microphone. (Photo courtesy Charlie's son, Chuck Stookey).

Stookey probably didn't notice. He was more than likely plotting another creative way to handle his next on-air assignment. The mic is perched upon a highly-prized Palmenberg stand. A little man, Charlie has his leg wrapped around the neck of this desk stand, making it appear to be a floor stand. Just another individualistic Stookey touch.

***BOOKS**, continued from page 31*

wire is used as a transmitting antenna, sending signals to submerged submarines using Very Low Frequencies (VLF). Other land-based antennas over 50 miles long transmit to submarines using frequencies as low as 30 Hz, with a range up to 5,000 miles.

No book is perfect, and Coe may be content to know that great law includes even this highly readable book. Many AWA members know that KDKA pioneer Conrad's first name was Frank, not Charles.

Coe has also written *The Telephone and Its Several Inventors: A History* (McFarland, 1995) and *The Telegraph: A History of Morse's Invention and its Predecessors in the United States* (McFarland, 1993).

[Originally in the Pittsburgh Oscillator, *volume 12, number 2, June 1997, p. 7.]*

BY EDWARD P. SWYNAR, VE3CUI

A 1929 AMATEUR RADIO STATION FOR THE NEW MILLENNIUM

Part 1—The Hartley Oscillator/Transmitter

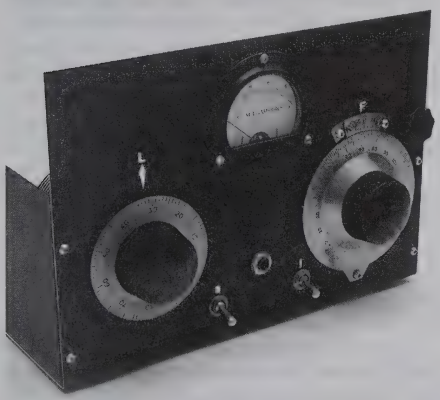
Introduction

I wish that I had been more interested in vintage radio away back in the early 70s, when I first received my Amateur licence! Stories abound of how legions of Hams then dumped (sometimes literally!) their old tube rigs, class B modulators, and now-classic *QST*s and *Handbooks*, all to embrace the "new technology" represented by solid-state active devices.

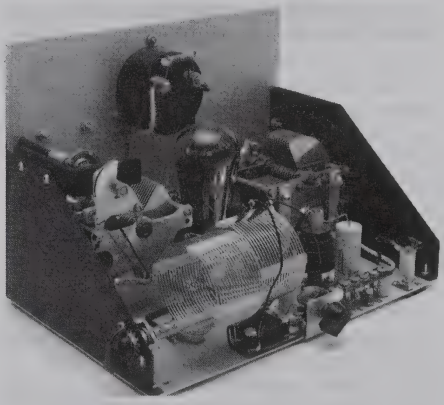
While we can hardly undo the mistakes of our yesterdays, we certainly have the ability to positively affect our todays. This I have done, I think, with my own personal tribute to an earlier golden age: amateur radio 1929-style. My replica rigs from the era recall those simpler times when but a single page of *Handbook* text could spell out the technical details of every known vacuum tube used by Amateurs.

I started initially with the subject of this article, a lone 245 Hartley oscillator transmitter, in order that I might compete in the 1996 Bruce Kelley Memorial 1929 QSO Party. As my interest snowballed, I next built a four tube regenerative receiver to match this rig. In 1999, my competitive spirit (and the after-hours QRO rule in the '29 QSO Party) inspired me to roll out a "pair of shoes" for the Hartley. Lastly, late in 2000, I decided it would be fun to check into the Sunday afternoon AWA AM net, and surprise Bob Raide (W2ZM) with my set-up on that mode. So I built a matching Heising modulator.

OTB articles on the receiver, amplifier, and modulator will soon follow this one. I hope the series will motivate readers who have not yet become involved in the 1929 QSO party to jump in



Front panel controls are (L to R): antenna coupling, spotting (dummy load) switch, low/high power switch, frequency set. External shunt converts 0-1 mA meter to read 0-100 mA.



Antenna coupling coil is at left foreground, with tank coil to the right of it. Variable bias resistor (with pointer knob) is below coils. Spotting capacitor is below and to left of meter case.

AUTHOR'S ADDRESS: 3773 CONCESSION RD. 3, RR #8, NEWCASTLE, ONTARIO L1B1L9, CANADA

and get their feet wet!

Why, in the year 2001, would we want to build and use equipment almost as old as amateur radio itself? Perhaps it's because there's a bit of magic involved with the whole process.As youngsters, we've all read books and seen movies about wonderful "time machines" that had the ability to transport us back in history. This is the stuff of dreams and science fiction writers, surely.

Yet you and I have the ability, right now, to build our own personal time machines. They will readily carry us back to a world where life moved at a much slower, simpler pace, and when real radio not only glowed in the darkness, it sometimes snapped and growled menacingly and emitted chirps and buzzes.

Guided by the words and wisdom of now-unknown and long since departed wizards found in early *QSTs* and vintage editions of *The Radio Amateur's Handbook*, we can assemble a collage of vintage components that will perform every bit like a piece of equipment that was actually made back in one of the "golden eras" of amateur radio.

Building the Hartley

My parallel-fed 160/80 meter Hartley is designed around a 245 triode tube whose construction could very well have pre-dated the "big crash" of 1929. I used as many period components as I could, especially eye-catching ones like the variable capacitors. A well-stocked junque box should yield most of the parts. And you can probably prevail upon some of your OT acquaintances to supply what you don't have.

Also, it's surely one of the worst kept secrets in homebrewing circles that the floor beneath the tables of most any hamfest or vintage radio flea market can be a veritable gold mine of inexpensive old parts that might not be "pretty enough" to be put up top on display. As a last resort, one can find almost anything these days—-no matter how obscure, it seems—-on the different Internet reflectors and chat rooms. And lastly, like it or not, old parts can also be found through the E-Bay auction service.

My choice of Barker & Williamson coil stock in the tank and antenna coupling circuits of a 1929-style rig was a departure from the ubiquitous coiled copper tubing. Messrs. Barker & Williamson did not incorporate themselves, I believe, until the early 30s. But weighing the consequences of introducing an historical inaccuracy against the room which would have been needed to accommodate a massive 160-meter copper tank coil made the decision an easy one for me.

Layout of the transmitter is simple enough; there really isn't too much to go wrong in this regard. Follow a logical "left-to-right" approach (much like a schematic diagram) when planning the physical placement of the parts, and everything should work out fine. Remember that transmitters like the one described here were entry-level rigs for neophytes back in the old days. If they could get them working, so too, can you!

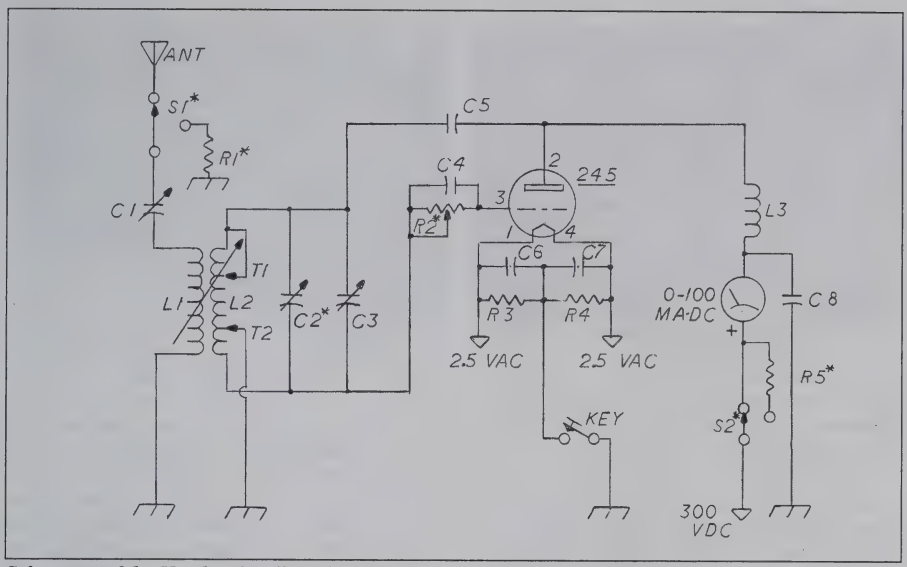
If you are used to homebrewing more modern equipment, you may well find it difficult to realize that you won't need elaborate shielding and bypassing techniques. All during the planning

(continued on page 41)

PARTS LIST

C1—500 pf receiving type air variable (antenna tuning)
C2—15 pf air variable (spotting control)
C3—500 pf receiving type air variable (frequency control)
C4—330 pf (approx.) mica
C5—2700 pf (approx.) mica
C6, C7—0.01 µf paper/ceramic (filament bypass)
C8—0.1 µf, 1000 V paper (plate bypass)
L1—antenna coupling coil, 17 µH (17 turns B&W #3031 stock)
L2—160 meters: 17 µH; 80 meters 4.25 µH (17 and 8 turns B&W #3031 stock, respectively). For dual band operation, cut for 160 meters, tap down for resonance on 80 meters.
L3—2.5 mH, 500-mA choke
R1*—50Ω, 10-watt (dummy load)
R2*—10kΩ, 2-watt fixed (or 100 kΩ pot, adjust for best keying)—bias set
R3, R4— 47Ω, 2-watt (balancing resistor)
R5—24kΩ, 10-watt (voltage dropping)
S1—spdt toggle (dummy load switch)
S2—spdt toggle (hi/lo power switch)
T1, T2—band set and feedback taps, respectively. Use Radio Shack mini alligator clips.

* Denotes optional component



Schematic of the Hartley Oscillator/Transmitter—drawn by John Haught.

1929 AMATEUR RADIO STATION, continued from page 34

and construction of my rig, I actually had to fight the instinctive urge to add a 0.001 µf capacitor here, a meter shield there, some shielded line everywhere, etc. In hindsight, giving up these techniques can really be quite liberating.

Many modern day replica rigs are built on the proverbial varnished pine "breadboard." A review of period construction articles shows that while this style of construction was certainly popular, it did not hold a monopoly. Progressive amateurs knew the importance of shielding, and early on I decided that the last thing I wanted to contend with was hand capacity effects during tuning.

Accordingly, the foundation of my transmitter is aluminum sheet, bent into an "L" (side gussets were added for rigidity). Body capacitance is a factor only when some appendage of mine is placed behind the front panel—-which is not exactly the safest place to be in any event, what with exposed 300 volt B+ lines laying about.

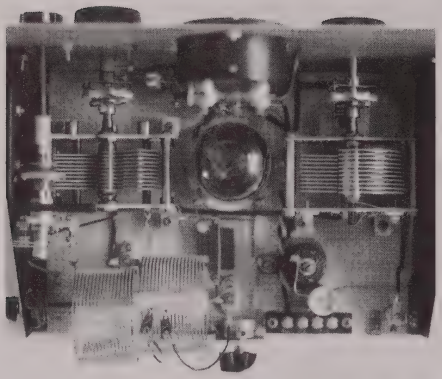
Tune-Up and Operation

The RF output of a self-excited transmitter of this type will be roughly one third of the actual input. With a plate current of 40 milliamperes from a 300-volt supply (12 watts input), this little rig puts out an honest 4 watts.

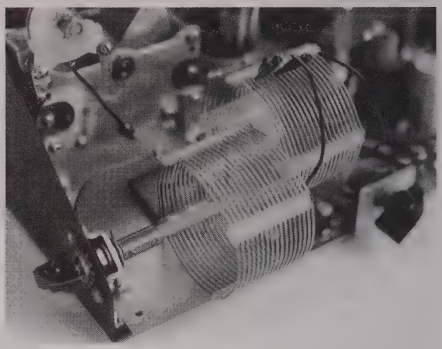
The adjustment of one of these rigs really can be critical, and by times quite confounding and frustrating—-forget all about the "...dip the final plate current/peak the grid drive" routine you learned as a novice with your DX-60! Before exposing your unsuspecting brethren to a sample of your 1929 signal, I implore you first to get some practice with a dummy load. A small Christmas tree bulb will work just fine in this application.

Place the feedback tap on your tank coil at about the mid-point. With your receiver tuned to some pre-determined frequency on the band, key the rig and swing its tuning capacitor through its movement, listening for a loud swish across the pass band. A plate current reading that goes off scale indicates the rig is not oscillating. Try moving the feedback tap on the coil one turn, either way, and repeat the procedure. *Note: before touching anything in back of the rig, remember to turn off the B+ and bleed the power supply capacitors by holding the key down until the meter drops to zero!!*

Eventually you will find a spot on the coil where the rig keys consistently, and the bulb lights up. Ideally, the tuning capacitor will be near fully meshed (the "High C tuning" mantra of the old days), and the plate current will be 40 milliamperes or so. If the tuning capacitor is nowhere near fully closed, add more inductance to the total tank coil; likewise, if the plate current is far removed from 40 mA, move the tank tap



Top view of Hartley provides a guide to parts placement.



Detailed view shows method used to vary coupling. Coupling coil is glued to wood dowel on control shaft. Coil swivels to maximum coupling when knob pointer is moved to "full up."

up, or down, and re-tune on the frequency.

You will see a change in current as the tap is re-located, affecting feedback. Keying "hardness"—the ability of the oscillator to start—will change as well. Always listen to the quality of your signal on your receiver.

Adjustment of the antenna tuning capacitor will also affect the transmitter's ability to oscillate readily. I have found that the capacitor should be swung to the point of maximum brilliance of the bulb, then retarded a bit and left there. The same applies to the coupling between the antenna coil and tank coil: over-couple the two at first, and then gradually decrease coupling just to the point where output begins to drop off slightly.

These techniques are nothing new...they merely mirror what has been in the text books for some 70 years.

Variations on a Theme

At the suggestion of Bob (W2ZM), I added a small variable capacitor (C2) in parallel with the main frequency adjusting capacitor to facilitate zero beating, and "spotting" of other signals on the air. It was a worthwhile addition. My own inspiration, a switch-selectable internal 52-ohm dummy load (S1/R1), was not so useful. I originally thought that I could use the scheme to zero-beat select stations without putting a QRM-causing "swishing" on the air.

Unfortunately, the real world characteristic impedances of my antennas did not necessarily match the set 52 ohm resistance of the dummy load. And any change in output load will change the frequency of the transmitted signal, however slight. If you don't believe this to be true, just check the stability of your transmitted signal on a windy day!. *(Suggestion: you might like to replace R1 with a Christmas tree lamp in a period-looking porcelain socket for use in practice-tuning as suggested earlier by the author.—ed)*

Switch S2 controls a low power option, possibly useful when using the rig as a driver for a final amplifier stage. It simply inserts a voltage-dropping power resistor in series with the B+. Construction may be somewhat simplified by deleting the antenna tuning capacitor (C1). At least one circuit that I researched instead had the antenna coil attached to a length of insulated tubing. Proper loading/coupling was attained by sliding the smaller diameter antenna coil/tubing assembly in steps within the tank coil (but without permitting one coil to physically touch the other). The benefit of this is easy enough to grasp: one less knob to crank! The addition of taps to the antenna coil would extend the flexibility of adjustment even further.

My rig includes both the antenna tuning capacitor and a means of controlling the separation between the antenna and tank coils. My junk box just happened to yield a unique integral panel bushing/shaft assembly that did the job. Use your mechanical ingenuity to work out your own technique. You may wish to mount your coils on separate insulators (glass towel rod is the traditional material) mounted in line with each other. Coupling is then varied by sliding the antenna coil closer to, or further away from, the tank coil.

Any power supply capable of providing 2.5 volts AC at 1.5 amperes for the filament, and 200 to 400 volts DC for the plates; will get you on the air. Remember, the more power you at-

tempt to draw out of the tube by increasing plate voltage, the greater the potential for thermal drift. I once conducted "brick-on-the-key" tests with voltages ranging from under 100 v. DC, to 375 v. DC on my Hartley: the results were rather eye opening. Not only was the signal much less prone to drift at lower voltages, it displayed better keying characteristics, too (there was less of a tendency to have it yoop, and chirp).

It goes without saying that good voltage regulation from the power supply is critical in this regard, but the effects of expansion of internal tube components due to heat dissipation should not be discounted.

Results

I've built several different transmitters in the course of my Amateur career, ranging from crystal controlled oscillators, to crystal-controlled MOPAs, to VFO driven MOPAs. Even though the 245 Hartley is far and away the simplest rig I've ever made in terms of design and construction, it was probably the most difficult to learn how to operate...properly! It's very tempting to call it just plain "ornery," but in all fairness, there is a definite learning curve that has to be traced before one can feel even remotely comfortable with its nuances. This is a beast that predates any and all methodology that we've all come to know and love, and it may well be a bit difficult to come to grips with this fact.

You're most assuredly not alone here. Quiz the participants in the '29 QSO Party, and they'll tell you, to a man, that these rigs have personalities all their own. Is it any wonder that early hams were wont to give their rigs affectionate nicknames? Can you imagine a ham of to-day christening his kilo-buck Yaesu, or Icom transceiver "Old Betsy?"

Look for any edition of *The ARRL Radio Amateur's Handbook* from 1929 through 1935. It will be a "must have" for your technical reference library if you intend to play with these early rigs. There are, as well, certain select articles in *QST* magazine that are nothing short of classics in this state of the art. Begin collecting those late 20s/early 30s issues—now! The brief bibliography at the end of this piece is a good place to start.

So, having read this far, you are probably wondering "How does the signal sound?" Well, it may be said with confidence that it sounds "...very 1929-ish" judging by comments received from two hams who reported on my signal when the rig was new, and who were actually first licensed 72 years ago, namely Bruce Kelley (W2ICE), and Fred Hammond (VE3HC), both are now, sadly, Silent Keys.

The note is definitely not up to the standards we have grown used to hearing in 2001: it has a definite chirp to it, but decidedly not one so severe as to prevent the rig from being keyed with a QRQ bug. It will drift ever so slightly during operation. I'm not sure if this is thermal drift due to the effect of 300+ volts of plate voltage, or whether it is because of the high circulating current in the tank (remembering that my design does not incorporate relatively massive heat dissipating ¼" copper tubing, but rather, skinny #14 tinned wire).

In any event, this little rig was responsible for a very respectable #4 finish position (tied) in its debut running of the AWA "1929 QSO Party" in 1996. It may be of interest to note that this was the first—and probably last!—time that I managed to secure bragging rights over W2ZM in the fray by actually besting Bob's score.

Acknowledgements

I'm appreciative of the information and encouragement afforded me by Jim Hinchley VE3CLX in the formative stages of this project. I am grateful, too, for the vision expressed by Bruce Kelley (W2ICE), along with everyone else associated with the AWA, for creating—and maintaining—the 1929 QSO Party as a thriving, dynamic outlet for the preservation, construction, and use of transmitters such as this one.

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BELOW 535

EDITED BY **FRANK LOTITO, K3DZ**, 1428 O'BLOCK RD., PITTSBURGH, PA 15239

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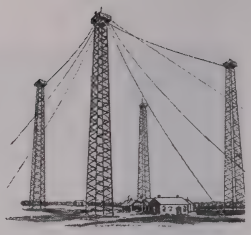

The Marconi Transatlantic Wireless Receiving Stationat Louisbourg, Nova Scotia, Canada

By Henry M. Bradford

With a little prodding, Henry Bradford has given us an excellent companion article to his two-part series on the pre-WW1 LF transmitting stations of the Marconi Transatlantic Service. In this article Henry presents the LF receiving equipment originally used at the Louisbourg, NS receiving station. I am sure you will find it amazing that, using no more than crystal detectors and acoustic-mechanical audio amplifiers, reliable transatlantic LF radio-telegraphic reception was a 24-hour a day reality prior to WW1.

The pre-WW1 LF receiving success was in part due to the manner in which short (non-closed loop) receiving antennas intercept radio energy. Since radio frequency energy is evenly distributed throughout the wave front regardless of the wavelength, the effective area that the receiving antenna can utilize varies directly with the square of the wavelength. Since LF antennas, even short LF antennas, are so large, LF antennas do extract a larger amount of energy than would an equivalent shortened HF antenna. (Thanks to WN3F for assistance on this simplified explanation.)

I am sure you will enjoy this article, including the unique photos and references given for the primitive, but effective receiving equipment!—fjl

In 1907 Marconi set up the first commercial transatlantic radio-telegraph service between Glace Bay, Nova Scotia, Canada and Clifden, county Galway, on the west coast of Ireland. The Glace Bay spark transmitting facilities were described in a previous AWA series [1]. This article will briefly discuss the separate long-wave receiving station that was built at Louisbourg, Nova Scotia, Canada a few years after the transmitter station at Glace Bay was put in service.

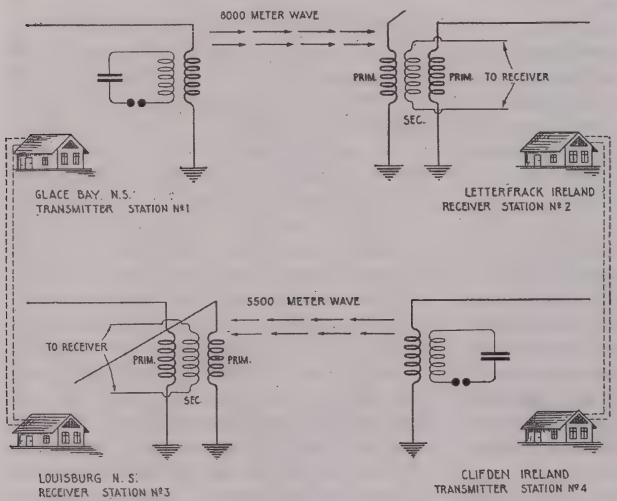

Fig. 1. The first duplex transatlantic radio telegraph circuit. The extra receiving aerials shown perpendicular to the transatlantic paths are the "balancing-out" aerials described in the text. (Adapted from Practical Wireless Telegraphy, by Elmer Bucher.)

Initially, the receiving facilities were located at the transmitting sites. But since the receiving equipment could not be used while the transmitter was operating, transatlantic communications could be sent in one direction at a time (simplex). In 1913 Marconi instituted simultaneous two-way (duplex) service by operating the transmitter on each side of the Atlantic on a different wavelength, and by building each receiving station far enough from its companion transmitter to minimize interference (desensing) from the transmitter.

West-to-east transmis-

AUTHOR'S ADDRESS: SITE 1, COMP. A-O, R.R. #2 WOLFVILLE, N.S., BOP 1X0 CANADA

sions were at a wavelength of 5500 meters (54.5 kHz), and east-to-west transmissions were at 8000 meters (37.5 kHz). The North American receiving station for the initial duplex Marconi trans-Atlantic system was located at Louisbourg, Nova Scotia. This station operated in conjunction with the Glace Bay transmitter. The Louisbourg receiving station was about 40 kilometers (25 mi.) south of the Glace Bay transmitting station (Fig. 1).

It seems remarkable today that when the transatlantic service began, it operated quite reliably without electronic amplification of the received radio signals. The low operating frequencies provided the advantage of fairly stable long-range communication for most of the 24 hour day. The major disadvantages of long-wave communications were high atmospheric noise level and the use of large, but inefficient, non-directional antennas. High transmitter power was used to compensate for these disadvantages. (Remember, a half wavelength dipole for 37.5 kHz is about 4000 meters, or 13120 feet, without corrections.)

The received signal passed through tuning circuits to the detector without amplification, as in a crystal set. Consequently, a large receiving antenna was required. The antenna at Louisbourg was a single wire about 3280 feet (one kilometer) long. It was supported by six towers about 330 feet (100 meters) high (Fig. 2). The wire extended in a westerly direction away from the vertical down lead to the receiver house. This layout was in accordance with the claim that an inverted-L antenna worked best if the free end of the horizontal run was directed away from the signal source.

To further reduce interference from the transmitter at Glace Bay, a one-and-one-half mile long balancing-out aerial about 50 feet (15 meters) above the ground was pointed in a southerly direction for best reception of the Glace Bay station. This antenna was tuned to the Glace Bay transmitter frequency of 54.5 kHz.

The balancing-out aerial signal was combined with the signal from the main receiving aerial (37.5 kHz plus some Glace Bay signal at 54.5 kHz) in a special transformer. The transformer design was intended to cancel out the Glace Bay signal received on the main aerial while passing the overseas signal from Clifden, Ireland. Similar arrangements were employed at the Irish receiving station at Letterfrack, county Galway.

The relatively low frequency and lack of RF amplification allowed the receiving apparatus to be laid out rather casually on benches (Fig. 3). A pair of "matched" carborundum crystal diodes were used in a balanced detector circuit [2]. The detector had two parallel diodes conducting in opposite directions. One was biased to rectify both weak signals and strong noise spikes, and the other was biased to rectify only the strong noise spikes. The "balancing" or cancellation of the two diode currents limited the amplitude of the spikes due to lightning discharges.

(Thunderstorm noise was, and still is a significant almost year around problem when receiving low frequencies.—fjl)

After detection, the Morse audio signal was boosted in amplitude by the Brown relay, a form of electromechanical audio frequency amplifier [3]. The relay worked on the principle of a headphone type of transducer; feeding sound into a carbon microphone via a common diaphragm. This arrangement made use of the fact that a car-

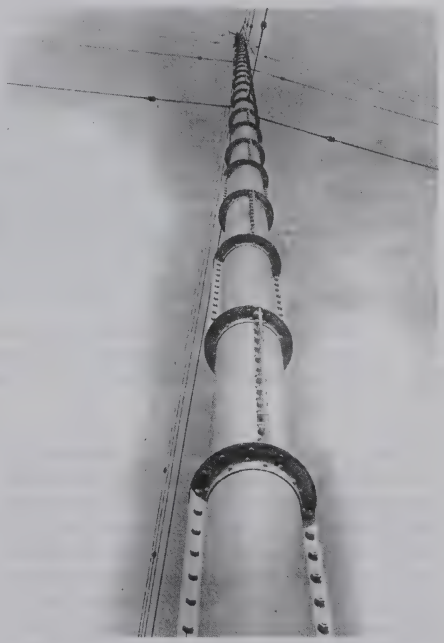

Fig. 2. One of the six towers supporting the main receiving aerial wire. The steel towers were about 300 feet (100 metres) high, and were surmounted by wooden topmasts about 30 feet (10 metres) high. The aerial wire, which does not show up in this photo, runs in a direction that bisects the right angle between the sets of guy wires. (Courtesy Beaton Institute, University College of Cape Breton, Sydney, Nova Scotia.)

E-MAIL: henry.bradford@ns.sympatico.ca

Fig. 3. Receiving equipment circa 1913. The tall coil in the corner is tuned to Clifden, Ireland. The other apparatus includes RF transformers with variable coupling between the primary and secondary coils, crystal detectors, and rheostats to control the DC biases on the detectors. (Courtesy Beaton Institute, University College of Cape Breton, Sydney, Nova Scotia.)

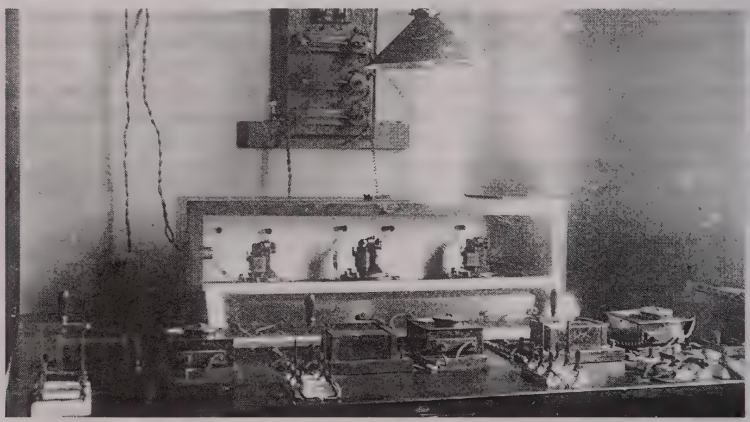

Fig. 4. Three Brown relays, which could be connected in cascade for maximum audio amplification. The apparatus on the table in front of them is associated audio transformers and DC power supply circuitry. The relays incorporated positive feedback, and had to be adjusted carefully so that they did not howl. (Courtesy Beaton Institute, University College of Cape Breton, Sydney, Nova Scotia.)

bon microphone is an amplifier, in the sense that its audio frequency power output can be much greater than the sound power input. Up to three relays were connected in cascade (Fig. 4). The result was that the Morse signal from across the Atlantic could be heard plainly by the operator, even with his headphones sitting a few feet away on the table.

The audio signal was recorded on a wax cylinder by feeding sound from a headphone into a Dictaphone type recorder. This allowed Morse messages received at a high speed to be played back and read at a lower speed (Fig. 5). High-speed transmission was accomplished by punching the message on a paper tape and feeding the tape into a Wheatstone automatic key (Fig. 6). Claims for transmission speed ranged from 60 to 100 words per minute. All this without a tube or a transistor!

The Marconi Towers Glace Bay transmitter

Fig. 5. Radio operator at work. The dictaphone in the left foreground is recording an incoming radio message, while the one to the right of the operator is set up for playback. The operator probably played a recording slowly while writing down the message, then typed it. (Courtesy GEC-Marconi Co., Chelmsford, England.)

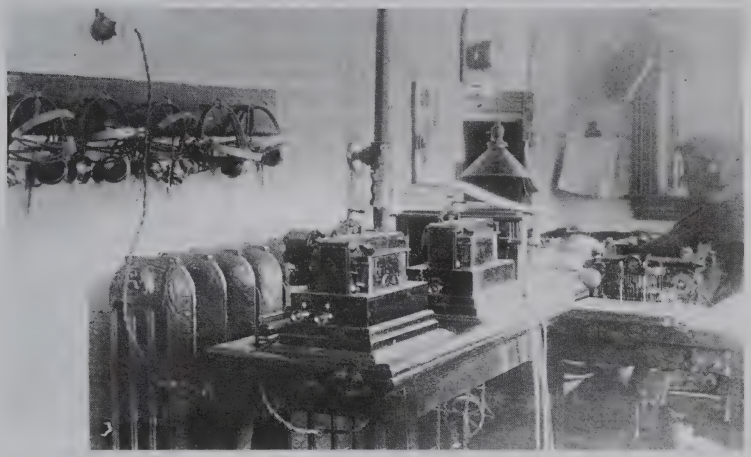

Fig. 6. These Wheatstone automatic keyers converted coded messages punched on paper tapes into high speed Morse code for radio transmission overseas. (Courtesy Beaton Institute, University College of Cape Breton, Sydney, Nova Scotia.)

was keyed by operators located at the Louisbourg receiving site. The keying link was done via land line telegraph. Thus Louisbourg became the communications center, relaying incoming and outgoing messages between the transatlantic radio link and North American telegraph lines (Fig. 7). An early writer described the station as a small central telegraph office in the wilds, utilizing the latest innovations in radio and line telegraph.

Being rather isolated, the Louisbourg receiving station was fairly self-contained (Fig. 8). It had a large hotel-type residence for single male staff, with a billiard table and tennis court. Louisbourg also had married staff quarters and a station manager's residence. Unlike the high powered transmitting stations, the main operational building was a simple one-story wooden structure. It housed the equipment for the receivers and telegraph lines, the engineer's and

Fig. 7. Land lines room circa 1913. The operators are listening to messages coming in from North American telegraph lines on sounders and writing them down for typing later. The same operators probably relayed messages received by the radio operator to their North American destinations via telegraph. (Courtesy GEC-Marconi Co., Chelmsford, England.)

Fig. 8. From left to right, the buildings are the "hotel" residence for single staff, the receiver house, and two duplex houses for married staff. The towers supporting the main receiving aerial are in the right background behind the duplexes. (Courtesy Notman Archive, McCord Museum, Montreal, Canada.)

operator's work areas, and the main office. During World War I, a company of soldiers was stationed nearby for protection against possible sabotage.

Vacuum tubes (valves) were gradually introduced into the system as tube equipment became more reliable. A circuit diagram dated 1916 still gave the option of switching from a vacuum tube detector to a crystal detector. Later photos showed that the Morse keys had been replaced by workstations with electric typewriters for punching paper tapes, along with associated vacuum tube equipment. Figure 9 shows a post-World War I vacuum tube receiver at the station with its horn-type loudspeaker.

By the early 1920s, transmitting tubes had been improved enough to operate at high power and high frequencies. Additionally Marconi,

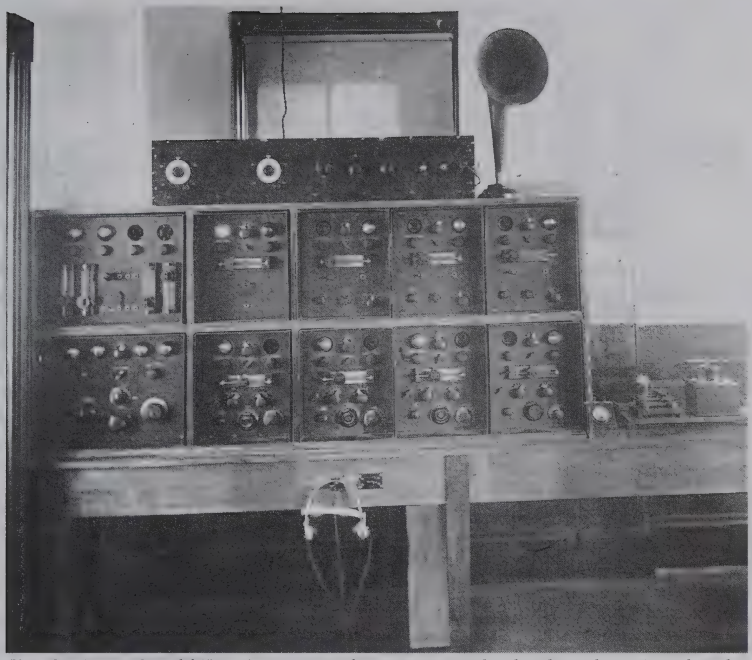

Fig. 9. A post-World War 1 vacuum tube receiver with a loudspeaker. Note that the earlier layout of components on benches had been replaced by rack mounting. (Courtesy Canadian Marconi Co., Montreal, Canada.)

using his ocean going yacht *Elettra* as a portable receiving station, tested the range of signals from his short wave station located at Poldhu, Cornwall, England. He concluded that short wave was better for long distance communications than long wave, in spite of the daily and seasonal variations in propagation.

Consequently Marconi changed his earlier proposal to build a British Empire radio communications network from long wave to short wave. The first link in the new short wave beam system was opened in 1926 between London, England, and Montreal, Canada. It operated at roughly 19 MHz in the daytime and 9.4 MHz at night. The short wave system soon replaced the long wave transatlantic service.

It was not long after the change to short wave that the Louisbourg receiving station was closed and dismantled. At the time of closing the main operational building was destroyed by fire. All instruments, charts and other station records were lost [4]. Today, nothing is left except the concrete guy wire anchors and concrete tower foundations in the fields and woods near a picnic site in the Fortress of Louisbourg National Historic Park in Cape Breton, Nova Scotia [5].

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3. Bucher ibid., article 152, page 170: "The Brown Amplifying Relay."
4. *Whisper In The Air—Marconi, The Canada Years, 1902-1946*, by Mary K. MacLeod, Lancelot Press, Hantsport, Nova Scotia, Canada (1992).
5. Strategically located near the mouth of the St. Lawrence River, Louisbourg was an important 18th century stronghold and commercial port in French North America. The fortress and about one-quarter of the original town have been restored as a cultural and tourist attraction operated by Parks Canada. Website address: http://fortress.uccb.ns.ca.

BY KEITH BAKER, VE2XL

A Method of Displaying Tubes

Originally Published in The Cat's Whisker, *Bulletin of the Canadian Vintage Wireless Association, March, 1978.*

Recently I needed to find a simple and economical way to mount a number of radio tubes for display in a secure and safe manner. The tubes had to be individually movable so their positions could be adjusted for best effect. And the mounting bases had to have enough mass to provide stability in case of accidental bumping. The material would have to be readily available, easily worked and cheap.

Wood was rejected because the common varieties did not have enough mass. The large rubber flask stoppers used in chemical plants and laboratories filled almost all the requirements, but were relatively expensive.

The best solution was found to be the common hockey puck. It comes in a number of sizes, has the desired mass, and is easily worked with available hand tools. It is relatively inexpensive and the price can usually be negotiated for quantity purchases. For special shapes or forms a puck can be turned on a wood or metal working lathe (Fig. 1).

The original plan called for mounting appropriate tube sockets on the mounting bases with wood screws. but it proved difficult to locate sockets in the variety and quantity needed. It was found that, by drilling the puck with the correct sized holes, the puck itself would serve as the socket. A drill press for this function is desirable but not really necessary. A hand drill will work fine.

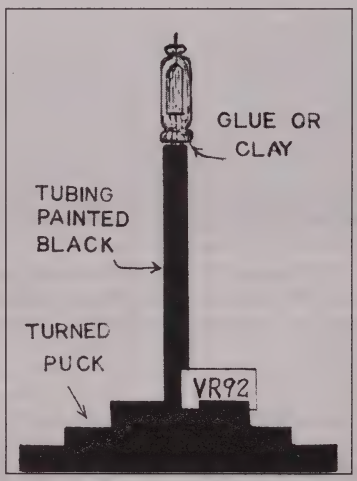


Fig. 1. Puck can be turned in a lathe to form a decorative base for special displays.

The first step is to locate and mark the center of the puck. If a center finder attachment for a hand square is not available, a substitute can be fabricated easily from folded sheet metal or wood scraps (Fig. 2). Place the center finder on the puck and draw a line with a soft lead pencil or a colored marking pen having a fine tip. Then rotate the puck 90 degrees and make another mark. The intersection of the two lines is the center. Pushing a sharp metal point into this cross mark will make the center more visible and will serve as a starting point for the drill.

There are two simple methods for marking the location of the tube pins on the puck. The first way is to press the tube pins into a sheet of thin wood or metal through a sheet of carbon paper. Drill the marks left by the carbon paper with the correct size of drill. Mount a self tapping screw at the center of the template you have just made and screw it to the center of the puck. This will hold the puck in place while you drill through the template.

The second method is to mark the pin locations directly on the puck. Chalk the tube pins or press them against the white chalk form of carbon paper used by stenographers for typing corrections. Now press the tube pins gently into the surface of the puck and the marks produced will provide a drilling guide.

For loctal and octal tubes, as well as those with exposed base exhaust tips, you'll need to drill an accommodating hole before you can make the marks. Select a drill size which will permit a gentle press fit.

At room temperature the puck has a bit of flexibility,

AUTHOR'S ADDRESS: 133 JASPER RD., BEACONSFIELD, P.Q., CANADA H9W 5R7

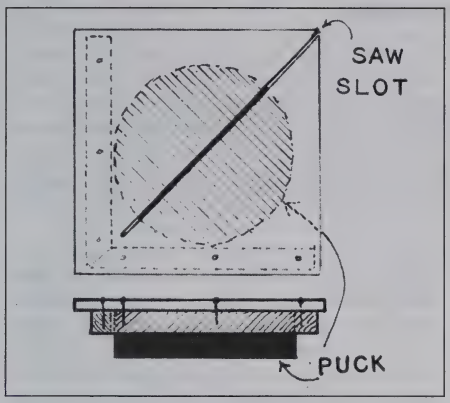


Fig. 2. Using an improvised center finder to mark the center of the puck (see text).

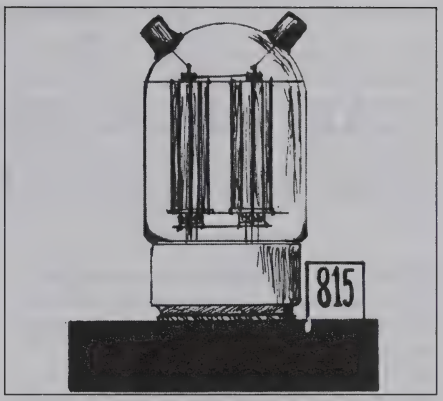


Fig. 3. Tube mounted directly in a puck drilled to form a "socket."

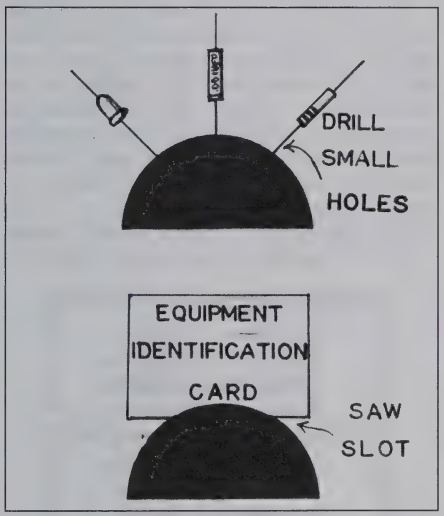
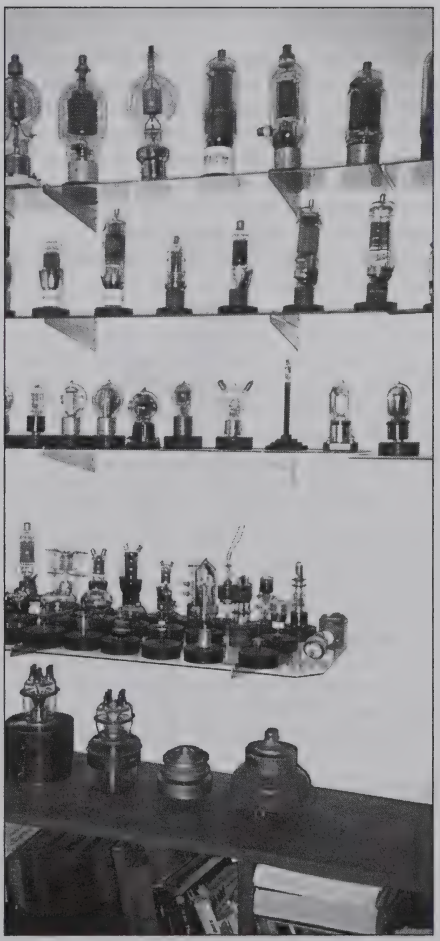


Fig. 4. Half-puck mounts.

so it will accommodate small misalignments and still permit the tube pins to be firmly seated. It is advisable to use only gentle pressure in inserting the tube pins in the holes. The tube pins do not have to seat right to the bottom. If the puck is gripping them adequately, as little as a quarter of an inch will be sufficient to hold the tube firmly in place.

A neat way to label the puck holder is to slot the surface with a fine saw blade and insert a card on which the information is typed or lettered (Fig. 3). Sawing a puck in half provides another configuration (Fig. 4).

For larger type tubes you might want to consider using a separate a puck for each pin.



A portion of the author's tube display.

BY JAMES P. RYBAK

EARLY EUROPEAN TELEVISION: THE MIHALY TELEHOR MACHINE

The years immediately following World War I were not favorable for conducting television research in Germany or in any of the countries that had been created from the former Austro-Hungarian Empire (Germany's wartime ally). The economies of these defeated nations were largely in ruins. There was little in the way of equipment, money, or facilities available for attempts to develop "non-necessities" such as television.

Nonetheless, Hungarian-born Denes von Mihaly began making noteworthy contributions to television technology at this difficult time, first in his homeland and later in Germany. Mihaly's name soon became internationally recognized as a result of his work. Both Hungary and Germany proudly include Mihaly among their earliest and most noteworthy television pioneers.

Denes von Mihaly was born near Budapest in 1894. Little is known about his early life other than he received a degree in mechanical engineering at the Technical University in Budapest. Nicholas Langer, who later became Mihaly's technical assistant, has claimed that Mihaly first began his work to develop television in 1916 and that by 1919 was able to transmit crude silhouette images measuring approximately 10×10 cm. [1].

Others question whether Mihaly's work had progressed that far by 1919 [2]. Since Mihaly published nothing concerning his work until 1923, there seems to be some justification for this skepticism. Mihaly's 1923 publication [3] was a summary of the work he and others had done to that time to develop television. It has the distinction of being the first book devoted entirely to the topic of television [2].

In 1924, Nicholas Langer published several articles in English language journals describing

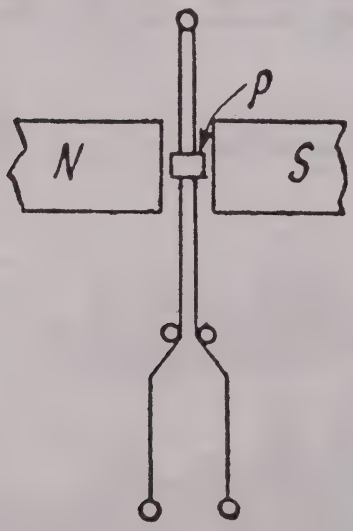


Fig. 1. The basis for Mihaly's scanner was a small mirror connected to a loop of wire positioned in a strong magnetic field.

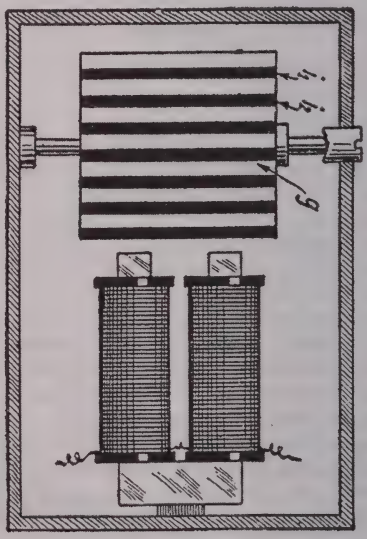


Fig. 2. A tuning fork interrupter was used to generate current pulses at a precisely controlled rate.

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Mihaly's "Telehor" system of television [1, 4]. Recognizing their significance, Alfred Dinsdale included the principal parts of these articles in his comprehensive book on television written in 1932 [5]. Mihaly's approach to the development of television was substantially different from that of his contemporaries in other countries.

The most innovative feature of Mihaly's Telehor was the manner in which it performed scanning. The scanner was based on a square mirror measuring approximately 1 mm on a side. This mirror oscillated simultaneously in two directions to scan images.

The heart of Mihaly's scanning device is shown in Fig. 1. The small mirror, denoted by p, was attached to a loop made from .01 mm diameter platinum wire. The loop with the mirror affixed to it was stretched between the poles of a strong magnet. Current flowing through the loop caused the mirror to rotate. This was the same basic configuration as was employed in the Siemens oscillograph commonly used at the time.

Precise control of the mirror's scanning motion was achieved in a most novel manner. For this purpose, Mihaly utilized both a tuning fork interrupter and a La Cour phonic drum. These devices are shown in Figs. 2 and 3, respectively.

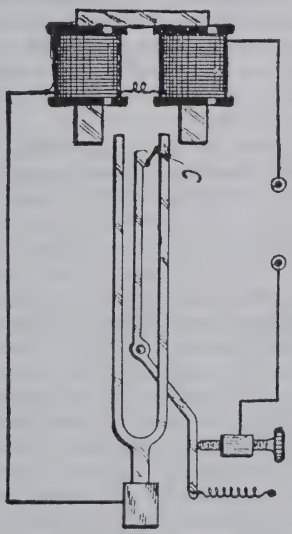


Fig. 3. The "phonic drum" used by Mihaly to control the motion of his scanner.

The tuning fork interrupter operated much like an ordinary electric buzzer or bell. A tuning fork with a natural frequency of 100 Hz was positioned between the poles of an electromagnet. When current activated the electromagnet, the tines of the fork were attracted toward the pole pieces, thereby opening the electrical contacts at point c. This caused the current activating the electromagnet to stop flowing. As a result, the tuning fork tines returned to their original position and the contacts closed causing the process to repeat. Consequently, pulses of current flowed at an extremely precise rate that was determined by the natural frequency of the tuning fork [2, 4].

The La Cour phonic drum has been described as "the simplest possible synchronous motor" [4]. It consisted of a small, hollow, non-magnetic drum partially filled with mercury. Around the periphery were arranged 20 equally spaced thin iron strips. The drum was mounted on pivots at the centers of its ends and was positioned near the pole pieces of an electromagnet.

The relationships of the scanning mirror d, tuning fork interrupter i, and phonic drum g to the other components of Mihaly's Telehor sender are shown in Fig. 4. When the phonic drum's electromagnet was connected to a pulsating current supply, the drum rotated at a speed such that the number of iron strips passing the pole pieces per second was equal to the frequency of the current pulses flowing through the coil of the magnet. Since the current produced by the tuning fork interrupter flowed at a precisely controlled rate of 100 pulses per second, the drum with 20 iron strips rotated at exactly 5 revolutions per second.

The rotating phonic drum was connected to a 100-segment commutator k2 with sliding contact k1 that interrupted the current from a battery. The current produced consisted of 500 pulses per second and flowed through the platinum wire loop attached to the oscillograph mirror. These current pulses caused the mirror to oscillate at a rate of 500 times per second in the vertical direction. The motion of the platinum wire loop in the horizontal direction was controlled by the rotation of the drum. As a result, the combined motion of the mirror consisted of 500 vertical and 5 horizontal oscillations per second.

Scanning of an image requires that it effectively be resolved into a number of small elements. To achieve this, the lenses a and b of Mihaly's Telehor sender created a reduced-size version of the original image on the oscillating mirror d. The reduced image then was reflected

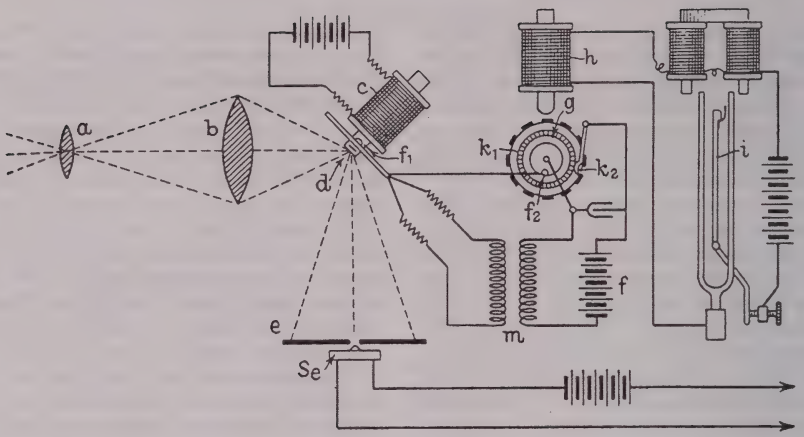


Fig. 4. The Telehor sender.

onto a 1 mm wide aperture in diaphragm e. The reflected image was approximately the same size as the original image due to the "swing" or divergence of the light rays produced by the oscillation of the mirror. A selenium photocell Se, approximately 1 sq. mm in area, was located behind the aperture in the diaphragm.

Since the mirror vibrated 500 times per second in the vertical direction, the reflected image moved at the same rate vertically across the aperture. In addition, the mirror and the reflected image oscillated in the horizontal direction at a rate of 5 vibrations per second. As a result, the complete image was scanned completely in 1/10 of a second. This amount of time corresponded to one-half of an oscillation of the mirror in the horizontal direction. During that time, the mirror oscillated 50 times in the vertical direction. Because the two oscillating motions of the mirror occurred simultaneously, a 50 line, zigzag scanning pattern was created.

The resistance of the selenium photocell varied with the intensity of the light from the portion of the reflected image falling on the aperture at that instant. This produced a change in the current that flowed in the photocell circuit as the brightness of the image changed from point to point. The current was amplified by a vacuum tube and then traveled from Mihaly's Telehor sender to his receiving circuit by means of a transmission line.

Mihaly's Telehor receiver, shown in Fig. 5, was similar in many respects to the sender just described. Unique to the receiver, however, was the "light-relay" which converted the signal from the Telehor sender into a light beam proportional in intensity to the amplitude of that signal. This light-relay, located at the top of Fig. 5, was basically a specially designed oscillograph. The arc lamp o produced a narrow but intense beam of light on the small mirror p of the receiving oscillograph.

The current received from the Telehor sender flowed through a thin wire loop supporting the mirror. This caused the mirror to be deflected in direct proportion to the amplitude of that current. The deflection of the mirror, in turn, varied the amount of light that fell on aperture in diaphragm e. As a result, the amount of light that passed through the aperture was directly proportional to the amplitude of the current received from the sender.

The beam of light passing through the aperture then went to the receiver scanner that consisted of the tuning fork interrupter i, phonic drum g, and oscillograph c. These components provided the appropriate deflection of the light beam needed to reconstruct the original image on the ground glass surface located at t.

Synchronization between the sending and receiving scanners was critically important for the reception of images. The slightest deviation from perfect synchronization resulted in the production of undecipherable random patches of light and dark at the receiver. In principle, simultaneous starting of the sending and receiving station tuning forks would keep the two units in synchronization for hours. In practice, however, establishing and maintaining perfect synchronization could be difficult.

Mihaly developed an innovative method for establishing and maintaining synchronization automatically. A glass plate with an opaque spot located on each of three of its edges was placed

in front of lens b of the sending unit. This caused three corresponding spots to appear at the edges of the image produced by the receiver. If perfect synchronization was achieved, these spots always were located in exactly the same places. Mihaly placed selenium photocells at these spots on the ground glass surface on which reproduced images were displayed.

When perfect synchronization existed, the photocells were in darkness and their resistances were very high. Loss of synchronization meant that the three black spots no longer were at the specified locations. This, in turn, caused the resistance of one or more of the photocells to decrease. Mihaly designed a system of relays, magnetic coupling devices, and brakes (not shown) to restore synchronization to his Telehor system when a change of photocell resistance occurred.

Langer's reports of Mihaly's experiments were very unclear concerning the precise degree of success achieved. It was emphasized that shortages of materials and equipment were a serious problem for Mihaly both during and following World War I. As an example of the severity of the shortages, Mihaly was forced to construct his own vacuum tubes. The shortages grew steadily worse, finally compelling Mihaly to suspend his experiments in mid-1923.

These shortages were not the only obstacle that kept Mihaly from completely achieving his goal. While trying to perfect his Telehor, Mihaly encountered some technical problems that he could not overcome. Although he was able to transmit moving silhouette images of white geometrical shapes on a black background, Mihaly was "depressed by the bad results." The received pictures were poorly focused [2, 3, 6].

The reason for this problem was that Mihaly had made several fundamental errors in the design of his optical system. Mihaly initially was not aware of these mistakes. Another scientist, Alice Everett, identified the problems in a 1927 letter to the editor of a British journal [6]. Everett showed that there was no way Mihaly's optical system, as originally designed, could produce a sharp image. Whether or not Mihaly or anyone else could have redesigned the optical system to eliminate the focusing errors is not clear.

It would be wrong, however, to conclude that Mihaly's experiments were unsuccessful. His book, together with the other published reports of his work, demonstrated that the electronic transmission of moving images likely would be achieved in the not too distant future. It has been suggested that a paper written by his assistant (Nicholas Langer) may have helped to inspire John Logie Baird's television work [7, 8].

Following the suspension of his experiments in mid-1923, Mihaly moved to Berlin. Here he received a modest amount of money and other forms of support for his work from several German sources including, eventually, the German Post Office. Mihaly became a key figure in encouraging television development in Germany.

The next English language reports concerning Mihaly's work did not appear until 1929 [9, 10]. Prior to 1928, Mihaly had abandoned the use of

(continued on page 58)

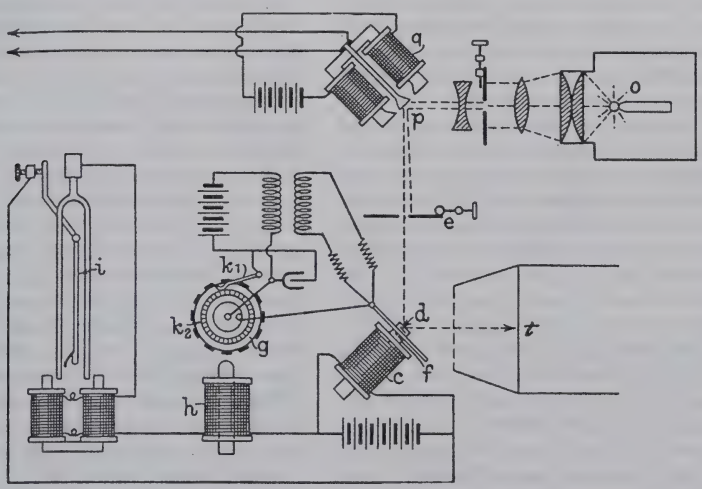
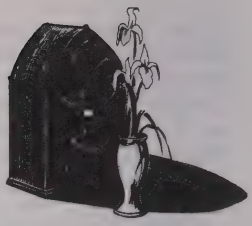


Fig. 5. The Telhor receiver.

Recent Radio, TV and Entertainer Obituaries



COMPILED BY **CHARLES S. GRIFFEN W1GYR**
1225 NEW BRITAIN AVE., WEST HARTFORD, CT 06110-2405

Note: When known, the date of death is indicated in parenthesis.

FRANKIE CARLE, 97, (3-7-01) pianist, big-band leader and composer. Carle toured with the Mal Hallett Band during the 1930s and later joined the Horace Heidt Band where he became a featured pianist. He remained with Heidt until 1944 when he left to form his own band which continued to perform until the early 1960s. Carle continued playing at concerts on his own into the 1980s. He composed *Sunrise Serenade, Falling Leaves* and *Roses in the Rain*. In addition to remote radio broadcasts, Carle's band was featured on *The New Old Gold Show* during 1944 on CBS. On TV he starred on *The Golden Touch of Frankie Carle* (NBC 1956).

PERRY COMO, 88, (5-12-01) singer. In 1932 Como left his work as a barber in Canonsburg, PA, to sing with Freddy Carlone's Band in Cleveland. Four years later Como joined the Ted Weems Band where he remained until Weems left for military duty in 1942. In 1943 Como's rich voice and easy style earned him a recording contract with RCA Records and a seven-year motion picture contract with 20th Century Fox. Some of his biggest record hits were *Because, When You Were Sweet 16, Don't Let Stars Get in Your Eyes, Round and Round* and *Catch a Falling Star*. In all, Como's worldwide record sales topped the 100 million mark. His film credits include *Something for the Boys* (1944), *Doll Face* (1945), *If I'm Lucky* (1946) and *Words and Music* (1948). Como was also heard on the radio singing with the Ted Weems Band on *Fibber McGee and Molly* (NBC 1936-1937), Ted Weems Orchestra on *Beat the Band* (NBC 1940-1941), and *The Chesterfield Supper Club* (NBC 1944-1950). He made his debut on TV in 1948 on *The Chesterfield Supper Club* (NBC 1948-1949) which became the *Perry Como Show* (CBS 1950-1955, NBC 1955-1959) and concluded as *Perry Como's Kraft Music Hall* (NBC 1959-1963). Como, who was still doing TV specials into the 1980s, received four Emmy Awards and in 1987 President Reagan presented him with a Kennedy Center Award for outstanding achievement in the performing arts.

PEGGY CONVERSE, 95, (n.d.) actress. Converse appeared on television from its beginnings, as well as in movies and in hundreds of stage productions. Some of her TV credits include *The Alfred Hitchcock Hour, The Danny Thomas Show*, many episodes of *Perry Mason* with Raymond Burr, and roles in *The Young and the Restless, General Hospital* and *Days of Our Lives*. She was still working at 85.

ROSEMARY DeCAMP, 90, (2-20-01) character actress. DeCamp came to New York City in the 1930s and quickly found work in radio. She was a cast member on *Blondie, The Dreft Star Playhouse, Plays for America,* and played Nurse Judy (1937, and again 1943-1954) on *Dr. Christian*. DeCamp's TV credits include the role of Margaret MacDonald (1955-1959) on *The Bob Cummings Show*, Riley's wife (1949-1950), on *The Life of Riley*, first opposite William Bendix and then with Jackie Gleason. She also appeared as Helen Marie (1966-1970) the mother of Marlo Thomas on *That Girl*. Some of her film appearances include *Yankee Doodle Dandy* (1942), *Rhapsody in Blue* (1945), *Eyes in the Night, Commando Strike at Dawn* and *Two Guys from Milwaukee*.

BORIS GOLDOVSKY, 92, (2-15-01) pianist and opera broadcaster. Goldovsky's musical family fled to Berlin to escape the Russian Revolution and there he studied piano. He made his debut with the Berlin Philharmonic at 13. Later, although he disliked opera at first, he became one of its greatest proponents. Goldovsky was heard on The Metropolitan Opera radio broadcasts hosting his segment, *Opera News on the Air*, where he analyzed, played excerpts and made opera accessible to the entire nation via the *Texaco Opera Network* (Blue Network/ ABC, CBS and later a special network of 300 stations). He was also a regular panelist on the *Texaco Opera Quiz*. Goldovsky was heard on Saturday afternoons from 1943 to 1990.

ROBERT T. HOWARD, 73, (3-11-01) former NBC network President. Howard began his

career with NBC as a page in 1947 and steadily moved into positions of greater responsibility. In 1966 he became VP and GM of KNBC(AM) in Los Angeles and in 1973 was promoted to Vice President of Administration and Operations. In 1974 he was named President of the network, relocated to New York City, and remained in that position until 1977.

ANDY MOES, 50, (1-27-01) radio personality. Moes joined WROR(FM) in Framingham, MA in 1979 to become a part of the *Joe and Andy Show*. In 1991 he became the morning host for WEEI(AM) in Boston. Moes later joined WRKO(AM), in the same city, where, for four years, he anchored *Broadcasting Extravaganza*, a Saturday morning program. Management, noting his earlier success in the a.m. drive-time slot, reassigned him to co-host *Blute and Moes in the Morning*.

JAMES G. RIDDELL, 88, (3-23-01) former radio executive. Riddell, who came to the United States in 1921, joined the staff of WZYX(AM) in Detroit in 1932. In 1958 he left the station, where he was President, to become Executive Vice President of the American Broadcasting Company (ABC) in New York City. In 1959 Riddell moved to California where he became Executive Vice President in charge of the Western Division of ABC, ABC Television and Radio Los Angeles. He was also Executive Vice President in charge of the Western Division of KGO Television and Radio in San Francisco. Riddell retired from ABC in 1971 after 38 years with the organization.

CLAUDE SHANNON, (2-28-01) mathematician and electrical engineer. Shannon is considered to be the father of modern digital communications and information theory. While at the Bell Laboratories (1941 to 1972) he wrote a landmark paper *A Mathematical Theory of Communications*, which stated "...the fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point." The information content of a message, Shannon theorized, "consists simply of the number 1s and 0s it takes to transmit it." The idea was adopted by communication engineers and created the technology that led to today's Information Age. All communication lines are measured in bits per second, reflecting what Shannon had called channel capacity. Shannon, a Professor Emeritus at MIT, received numerous awards, including the National Medal of Science.

JIM SNYDER, 76, (4-19-01) broadcast journalist. Snyder was best known for his long associations with CBS and Post-Newsweek stations. Before joining Post-Newsweek in 1968 as Vice President for News, he had been the Washington producer for CBS' morning and evening news. Earlier, he had covered the Eisenhower and Kennedy administrations as a reporter and was also Washington Chief for Westinghouse Broadcasting. Snyder was one of the first news directors to put a black anchor on the air in the early 1970s at WTOP(TV), now WUSA(TV), in Washington, DC. He was also one of the first to hire female anchors. Snyder was the *Radio-Television News Director's* first recipient of the Leonard H. Zeidenberg First Amendment Award.

ANN SOTHERN, 92, (3-15-01) actress. Before becoming a film star, Sothern performed on Broadway in Ziegfeld's *Smiles*, Rogers & Hart's *America's Sweetheart* and with the national touring company of Gershwin's *Of Thee I Sing*. She appeared in 64 films beginning with *Let's Fall In Love* (1934), followed by *Kid Millions* (1934), in which she co-starred with Eddie Cantor, *Maisie* (series of nine from 1939 to 1947), *Lady Be Good* (1942) *A Letter to Three Wives* (1949) and *The Whales of August* (1988). Sothern starred on the radio version of *Maisie* (CBS 1945-1947, recorded and syndicated by MGM 1949-1953 and Mutual 1952) and made appearances on *The Screen Guild Theater* (CBS). Her television credits include *The Ann Sothern Show* (CBS 1958-1%1), *Love, American Style* (ABC), *Max Liebman Presents* (NBC), *My Mother the Car* (NBC 1965-1966) and *Private Secretary* (various time slots on CBS and NBC from 1953-1957).

WALTER STANTON, 86, (4-16-01) slide-in phonograph stylus inventor. Stanton, in the late 1940s, invented an easily replaceable phonograph stylus that made it possible for users to replace the needle assembly when it wore out instead of sending it back to the factory. In 1950 he purchased Pickering & Co., the audio component manufacturer that first sold his patented stylus. Later, in 1960, he founded Stanton Magnetics which was one of the first firms to sell magnetic cartridges that improved sound quality. He managed both companies until he retired in 1998.

BUDDY TATE, 87, (2-10-01) saxophonist. Tate was one of the famous tenor sax players with the Count Basie Band. He played briefly with Basie in 1934 before beginning a ten-year association with the band in 1939. In the 1950s Tate played with Lucky Millinder, Jimmy Rushing and Hot Lips Page before forming his own band in 1953. The band played regularly at New York's West End Cafe for more than twenty

years and at the Savoy Ballroom. Tate began his career in the Southwest playing with bands led by Terrence Holder, Andy Kirk and Nat Towles during the 1930s. His career of playing and recording continued into the 1990s.

CHARLES W. TAYLOR, 58, (5-6-01) broadcast journalist. Taylor joined ABC Radio in 1966 as a news writer. From 1968 to 1977 he was the Senior Editor responsible for the editorial content of ABC newscasts, bulletins and special reports. Beginning in 1977 and continuing until 1982 Taylor was a documentary and special-events producer. In 1982 he became a member of the White House Press Corps. During his 34 years in broadcasting he received many awards including the *Radio Television News Director's* Ed Murrow Award, the Ohio State University Award and New York Festival Award.

JOSEPH PETER ULASEWICZ, 74, (3-9-01), former NBC executive. In the early 1950s, after completing graduate studies, Ulasewicz' career advanced with RCA, reaching the level of VP/GM for the division in charge of Mobile Communications Systems in Meadowland, PA. He joined NBC in 1979 in charge of their Burbank facilities. There he oversaw the conversion from land-line to satellite transmission of the network's programming to their affiliated stations. Later, in 1980, Ulasewicz supervised the remodeling of their facilities. He was appointed VP of Operations and Technical Services in 1979 and continued in that position until 1991.

LEN WAYLAND, 80, (2-5-01) character actor. Wayland began his acting career on the Broadway stage in productions of *A Streetcar Named Desire* and *Dark at the Top of the Stairs*. In the early 1950s he moved to Hollywood and appeared in more than 350 television shows. Wayland made multiple appearances in *Dragnet, The F.B.I., Barnaby Jones, The Fugitive* and *Ironside*. Other TV credits include *Gunsmoke, The Wild Wild West, Adam-12, The A-Team and Columbo*. He also co-starred in Jack Webb's *Sam* (CBS 1978).

Information for this column was obtained from *The Big Bands* (4th ed.), *Broadcasting and Cable*, *The Complete Directory to Prime Time Network TV Shows 1946 - Present* (4th ed.), *The Encyclopedia of Jazz* (lst ed.), *The Hartford Courant, On the Air: The Encyclopedia of Old-Time Radio, The New York Times* and *Variety*. Thanks to George E. Hausske, W9OLE; Frank Q. Newton, Jr., W6SYG; and Dr. A. David Wunsch for additional source material.

EARLY EUROPEAN TELEVISION, *continued from page 55*

the oscillograph-type scanner and was using a conventional Nipkow disk. By March of 1929, he had succeeded in developing equipment for the transmitting of motion pictures by television. Mihaly successfully demonstrated the transmission of both silhouettes and moving transparencies at the 1928 and 1929 Berlin Radio Exhibitions.

Mihaly's subsequent work primarily was directed toward perfecting and marketing equipment for the televising of motion pictures. The high level of development attained by German television prior to World War II is due, in no small part, to Mihaly's achievements and encouragement. In the annals of television history, Mihaly's name and contributions are highly regarded in Hungary, Germany, and throughout the world.

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About Our
Feature Article Authors

LARRY BABCOCK
NIAGARADIO 2000: A Meet Report

Larry Babcock grew up in his dad's radio sales and service business, acting as a service tech and installing auto receivers while still in high school. After serving in the Infantry during World War II, he earned a BSEE degree at the University of Iowa and began a 37-year career at Bell Aircraft.

At Bell, Larry headed programs to develop radar and air-to-air microwave relay links for the RACAL missile system and, later, to evaluate the Army's military electromagnetic interference problems. During his last years at Bell, Larry was in charge of the design of electromagnetic compatibility (EMC), TEMPEST, ordnance safety, radiation hazards and lighting immunity for all military equipment produced by the company. Later, he worked in these same fields as a consultant for other companies.

Larry began collecting antique radios in about 1973. He specializes in Federal, Wurlitzer, and WW I aircraft sets, and has written a book on the history of Federal radio. He is on the AWA Board of directors and serves as a guide at the AWA Museum in Bloomfield.

KEITH BAKER, VE2XL
A Method of Displaying Tubes

Keith was born in England and educated in England and Canada. He is a 25-year member of AWA and a life member of IEEE. An amateur radio enthusiast for many years, his previous calls were VE5XX, VO2XX, and VO2XX/W1. He has had a long association with hockey pucks, having played since grade school. Neil is currently President and stand-by goalie of a local old-timer's hockey team.

HENRY M. BRADFORD
The Marconi Transatlantic Wireless Receiving Station at Louisbourg, Nova Scotia, Canada (in "Below 535")

In this issue, Henry is technically not a feature article author, but a guest author in the "Below 535" column. However the scope of his article is such that it certainly qualifies as a feature.

Henry's high school interest in radio led him to college studies in physics, and he eventually became a Ph.D. in solar radio astronomy. His interest in early radio began after learning of the three Marconi station sites at Cape Breton, Nova Scotia, where he was teaching. (See his articles: "Celebration of 100 Years of Radio in Cape Breton," *The OTB*, Vol. 36, No 4," "Marconi's Three Transatlantic Radio Stations In Cape Breton," *Journal of the Royal Nova Scotia Historical Society, Vol. 1/98*, and the two-part article "The Cape Breton Stations of the Marconi Transatlantic Radio Service" that appeared in earlier "Below 535" columns [*The OTB* Vol. 41, Nos. 3 and 4]).

Henry also authored the two-part series "Teslas' Dream: the World System of Wireless," which appeared in *The OTB* Vol. 40, Nos. 1 and 2.

JAMES P. RYBAK, W0KSD
Early European Television: The Mihaly Telehor Machine

James Rybak was born in Cleveland, Ohio in 1941. He has been interested in both radio and electronics, first as a hobby and then as a profession, for over 40 years. Jim holds B.S., M.S., and Ph.D. degrees in electrical engineering as well as Extra-Class amateur radio license W0KSD. He teaches engineering and mathematics at Mesa State College in Grand Junction, Colorado. In recent years, Rybak has published numerous articles in the U.S. and abroad on the history of both wireless and electrical technology. Many of these have appeared in *The OTB*. When not writing articles, he spends his free time trying to achieve "Worked All States" through the low-earth-orbit amateur radio satellites as well as trying to become knowledgeable about digital photography and slow-scan television.

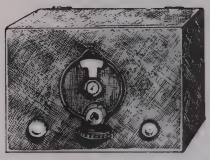
EDWARD P. SWYNAR, VE3CUI
A 1929 Amateur Radio Station for the New Millenium

Ed was first licensed as a radio amateur 30 years ago. A few years ago, he fulfilled a long-standing wish by building a 100% homebrew station based on 1960s technology. Not content with that, he later built a *second* 100% homebrew station—this time using 1929 parts and techniques. Ed belongs to DXCC, ARRL and AWA. He has received many awards, including RCC, WAS, WAC, and 5-band WAC, and has

(continued on page 63)

AMATEUR RADIO

EDITED BY **JOHN F. ROLLINS, W1FPZ**, HC 33, BOX 150, ARROWSIC, MAINE 04530
PLEASE INCLUDE SASE FOR REPLY.



2001 O.T. DX Contest Results

By Randy Haus, KB2PLW

"Lost in the Fifties Tonight..."

Like the title of the 1985 country hit by Ronnie Milsap, our O.T. DX contest is starting to take on a definite theme. Many of you wrote about your appreciation of 1950s gear and included photographs of some great fifties era stations. It was a time of innocence and promise and a stable, if uneasy peace. The big (and I do mean BIG!) manufacturers like Hammarlund, Johnson and Hallicrafters catered to Hams, and like the cars of the era, their stuff was beautiful, huge and heavy.

Hams all over America enviously followed the exploits of DX adventurers like Danny Weil, VP2VB, as he plied the South Pacific aboard his seemingly magic craft, "Yasme." Many of us looked forward impatiently to every new installment in *CQ*, as Danny provided rare DX contacts for thousands of Hams, and managed to run into every nice looking girl in the South Seas while doing it. Hmmm...just how did he get that job?

Anyway, the contest went well, with thirty-three official participants and four AWA stations that were on the air but did not send in logs. Please remember to send in a log if you do participate as it is the only way we can separate AWA stations from non-member stations who join in without realizing that this is a "members only" event. Contact with non-members during an AWA event is a great way to recruit, but is not a way of scoring points. Most participants would have liked to see a little more activity on twenty meters.

(continued on page 65)

Ed, K1GDH, sent in this photo of his beautiful old-time station, National NC-300 receiver and Johnson Ranger transmitter running 23 watts input. Both sets look to be "new in-the-box" condition. Super!

AUTHOR'S ADDRESS: P.O. BOX 665, TRUMANSBURG, NY 14886

THE *AWA REVIEW* VOLUME 14 TO BE AVAILABLE AT THE CONFERENCE

For 2001, the Antique Wireless Association is proud to present Volume 14 of the *AWA Review*. It contains 5 articles with over 200 photographs documenting the history of early wireless and radio. The articles have been prepared and researched by noted scholars of the history of communications. Volume 14 also contains the first cumulative table of contents covering all previous volumes of the *Review*.

The first article, on the role of spark keys in the history of wireless telegraphy, has been prepared by historians Russ Kleinman, James Kreuzer, Karen Blisard, and Felicia Kreuzer, who visited the AWA museum with a professional photographer to document items in the museum's collection. They also traveled to Washington to locate and obtain photographs of important historical items buried in the archives of the Smithsonian Institution. Their research has revealed a vast amount of information about early wireless companies and their products.

The second article is a summary of a project being conducted by Russ Kleinman and Karen Blisard in which they are attempting to chronicle and list all known manufacturers of spark keys. This is an ongoing project and it is updated frequently on the Internet.

The third article, on the history of the Canadian Marconi Company, was written by historians Robert Murray and Roger Hart. Roger was the manager of marketing services for Canadian Marconi for many years, during which he worked on documenting the history of the company. Using Roger's access to the records and archives of the company, the authors have put together a tremendous amount of information and some wonderful pictures—filling in the gaps in our knowledge of the evolution of this company.

The fourth article, which focuses on the work of DeForest and Johnson at the American Wireless Telegraph Company, was written by historian Glenn Trischan. Glenn has worked for Johnson Controls for many years and has had access to a vast storehouse of information from their archives. He has organized it into a time-flow picture of the history of the company and the individuals who played such an important role in its past.

The fifth article, written by art-historian Barbara Havranek, is a bit unusual. She has combined her love of radios with her knowledge and expertise in industrial design to tell us of the artistic and technical origins of some of the Bakelite radio cabinet designs.

The cumulative table of contents allows you to see the title of every article in every volume of the AWA Review since it began publication in 1986. This will allow historians and collectors to search for relevant articles in the back issues.

Thanks to all of the authors who worked with me to try to make their papers as complete and accurate as possible. We have jointly tried to present the material in a logical and readable format and your comments are welcome.

COMING: *AWA REVIEW* BACK ISSUE CD

Since some of the back issues of the Review are out of print, I have asked Marc Ellis, who produced the wonderful OTB CDs, to help me digitize these volumes and transfer them to a CD which I hope to have completed by September 2001. Future plans call for all volumes to be made available in this format as they become out of print. The material on a CD can easily be printed out if desired.

SILENT KEYS

We record the passing of the following AWA members with deep regret.

FREDERICK WALTER CREED, 80, VE3DZ (4-11-01)

WILLIAM R. PULHAMUS

FOREST O. REINE

Note: AWA officers and members are requested to submit all information about Silent Keys, with or without special recognition, to Joyce Peckham, Secretary, Box E, Breesport, NY 14816. This will help in the collection, coordination and appropriate recognition of both AWA members and others who have made contributions to the electronics and entertainment industries.

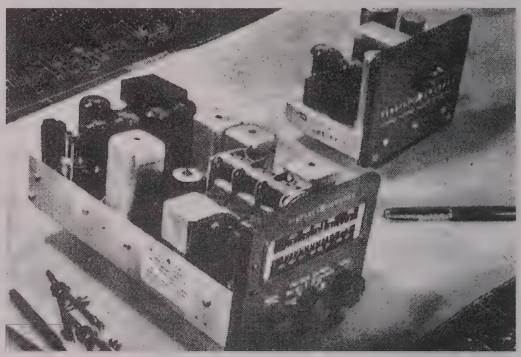
THE COMMUNICATIONS RECEIVER

EDITED BY **WILLIAM FIZETTE, W2DGB**, RR 1, BOX 55, HENRYVILLE, PA 18332
PLEASE INCLUDE SASE FOR REPLY.

The General Electric Flying Radiofone Types AS1B and AS1C

By Harry J. Miller, W4PDX
(ex-W2WNO, WA5JBY)

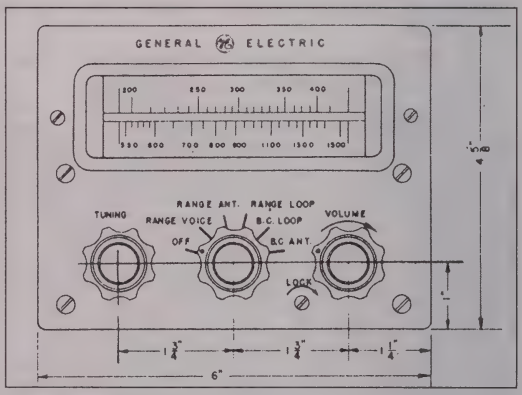
Reader Harry Miller, W4PDX, has presented us with a brief but interesting article on a short-lived post-WW II General Electric transmitter-receiver combination unit designed for use in private aircraft, and we present it here for your reading pleasure.—wbf



The AS1B Version of the "Flying Radiofone;" vibrator power supply at right.

In 1949, undoubtedly impressed by my charming personality and beautiful blue eyes (and possibly by my Class A amateur radio license) General Electric hired me to work at their Electronics Park facility near Syracuse, New York. I was seventeen years old, fresh out of high school and without any formal radio training, so I was assigned to testing transmitters used in an early 150 mc. two-way radio, the type 4ES1B.

In the same area where I was working, they were manufacturing two other interesting products. One of these was the "Flying Radiofone," a small two-way radio intended for use in private aircraft. Two configurations were available: the AS1B with control panel, transmitter and receiver in one unit and a separate vibrator power supply; the AS1C with control unit and receiver in one unit and transmitter and power supply in another. The transmitter-receiver combination measured 4⅝" high × 6" wide × 12⁹⁄₁₆" deep; the power supply 4⅝" high × 6" wide × 4¹³⁄₁₆" deep. Combined weight was 12.4 pounds.

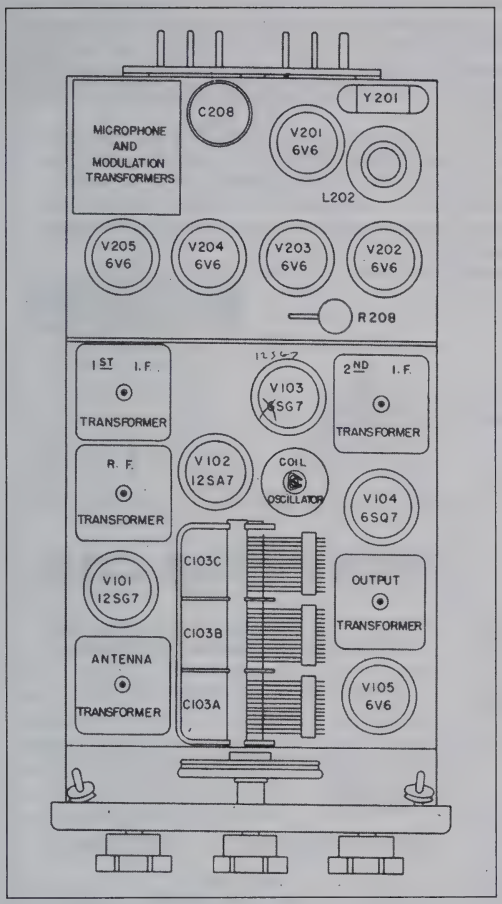


Front panel details.

The receiver covered the AM broadcast band, 550-1500 kHz., and the tower/range station band 200-420 kHz. A "T" on the slide-rule dial marked the 258 kc. universal control tower frequency. A single six-position rotary switch selected power on/off, frequency range, loop or wire antenna, and 1020 cycle filter in/out. Tuning and volume were the only other controls. Tube lineup: 12SG7 rf, 12SA7 converter, 12SG7 if, 6SQ7 detector & audio, 6V6GT audio output. Provision was made for loudspeaker and two pairs of headphones.

The transmitter put out "12 watts gross" and was normally supplied single frequency on 3105 kc., the universal private aircraft-to-ground

AUTHOR'S ADDRESS: P.O. BOX 66, OILVILLE, VA 23129



Top view of AS1B version.

channel. An occasional radio, called "two-frequency," was arranged to double in the final amplifier to 6210 kc. ("Piper 25N, Syracuse Tower; unable DAY, try NIGHT")!! Tube lineup: 6V6GT crystal oscillator, (2) 6V6GT parallel final amplifier, (2) 6V6GT plate modulator. A unique component in the transmitter was the carbon microphone-to-grid and modulation transformer contained in a single metal case.

These radios were apparently made from about 1946 thru 1949. At the time I was there, GE was starting production of a VHF version to replace the AS1B/C. This was not a successful product and the company soon abandoned the aircraft radio business. As far as I know, they never returned to it. I actually used one of these AS1 transmitters as a 75-meter mobile with some success in the early 1950s.

The second product manufactured was a communications receiver, about which I remember very little. As I recall, it was AC-powered, had a bright blue front panel and shiny knobs, definitely had a signal-strength meter, probably had a cw oscillator and bandspread of some type, and probably covered 550 kc. thru 30 mc. I've never seen one anywhere other than in the factory at that time. I have no idea how many, if any, were ever sold. If any reader can supply additional info on this receiver, I will be most grateful.

This radio is another example of a specialized product seeking a market niche, but apparently it was overtaken by either technology or competition, or both, since, according to the author, GE dropped the product after only a few years. There is nothing especially noteworthy about the design or the product, other than good basic engineering and an assumed GE quality of production. Considerations had to be reliability, ease of operation, and the weight and space limitations imposed by use in small aircraft. The design and materials (including the use of reliable octal tubes and the format of the manual) suggest a strong World War II-era influence. Our thanks to author Miller for sharing his background and knowledge of this unique piece of history of radio communications technology.

ABOUT OUR AUTHORS, *continued from page 59*

received certificates for his achievements in the ARRL DX and 160-meter contests the CQ 160-meter contest.

Though his contesting days are over for now, Ed loves building OT radio and experimenting with antennas on his 4 acre lot. He received a Bachelor's Degree in economics and history degree from The University of Western Ontario (1974), and has been with the Quality Assurance department of General Motors for some 26 years. He has been previously published in *QST* and *CQ* magazines.

BUSINESS CARD ADS

Are you offering a product or service of interest to antique radio enthusiasts? Would you like to let the world know about the tubes, sets or paper you'd like to acquire? Place a business card in this space for the low price of $15.00 and it will seen by over 4,000 hard core devotees of our hobby. Purchase a year's worth of insertions (four issues) for $50.00 and save $10.00 over the individual ad pricing.

Send us a copy of your business card, or a special typeset ad designed to fit our standard space. We can, alternatively, typeset a short message for you (no more than eight lines, 50 characters max per line, please). For the time being, there will be no charge for typesetting. All ads must be for radio-related items or services and must be paid in advance. Send your ads and checks (payable to AWA) to Robert W. Perry, "Smoke Signals," 131 E. High St., Painted Post, NY 14870. Closing date is six weeks prior to first day of month of issue. **All advertising income is used to further the conservation work of the AWA Electronic Communication Museum.**

AMATEUR RADIO, *continued from page 60*

The most notable contact of the event occurred between Bob Lundstrom K1FI and Sven Hed SM4DIG in Avdalen, Sweden. Bob and Sven carried out an old time radio experiment, cutting power throughout their contact until they were down to five watts and eight watts respectively and were still able to read each other's signals. Nice going, gentlemen!

The most attractive station photo was sent in by Ed Jarmolowicz K1GDH, consisting of a National NC300 and a Johnson Ranger. This is the kind of station that makes you want to turn off all the lights in the shack just so that you can stare at it.

Congratulations to Bob Raide W2ZM, who was high scorer with 306 points. Bob was running a 1953 QRP transmitter based on the 6AQ5 tube. Here is a breakdown of the scores by zone:

Eastern Zone

Station	Points	TX	RX
K1FI	28	Mod	1937 HRO
W1FPZ	48	1938 Homebrew	Mod
K1GDH	90	1955 Johnson	1954 National
W1GIG	18	1956 Elmac	1957 Hammarlund
W1TSP	86	Mod	Mod
KA1CFQ	30	1945 MOPA	Mod
K2KK	42	1954 Johnson	1959 Hallicrafters
KB2PLW	56	1938 Homebrew	Mod
W2LID	3	Mod	Mod
W2LYH	63	1936 6L6	1936 six tube superhet
KE2O	21	Mod	Mod
W2RS	162	1959 KWM-2	1958 Collins 75 S-1
WB2SYQ	30	1955 Johnson	Mod
N2YR	19	1957 Johnson	1959 Hallicrafters SX 101
W2ZM	306	1953 6AQ5	1939 Hallicrafters SX 25
W3CNS	126	1956 Eldico	1959 RME 6900
KD3OR	17	1938 1 tube ECO	Mod
W3VVS	45	1935 Meissner	1935 RME 69
W5WS/3	96	1941 807	1938 Hallicrafters SX 24
N4AWA	18	Mod	Mod
AA4RM	54	1957 KWM 1	1957 KWM 1/'59 Drake
K4JYS	84	1954 Elmac AF-67	1958 Hammarlund HQ170
WD8OFB	6	1939 6L6 XTAL	1939 Hallicrafters
AA9DH	17	1948 Hallicrafters	1945 Hammarlund HQ 129
VA3RSA	114	1958 Heathkit DX40	Mod Heathkit
VA3HN	3	Mod QRP	Mod

Western Zone

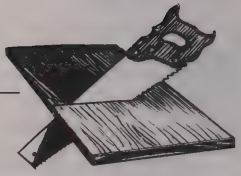
AC5AM	156	1958 Heathkit DX40	1938 Hallicrafters SX 16
K5RB	82	1945 Millen 6L6/807	1936 National SW-3
K6TQ	99	1938 6L6/807	1936 National HRO
W6TDP	66	1953 Elmac AF-67	1939 Hammarlund HQ120
W6ZZ	32	1953 Johnson	Mod
W7LOG	6	Mod	Mod

DX Zone

SM4DIG	9	Mod	Mod

BREADBOARDING

EDITED BY **RICHARD A. PARKS**, 2620 LAKE RIDGE CT., OAKTON, VA 22124
PLEASE INCLUDE SASE FOR REPLY.



Bring Historical Circuits to Life On Your Workbench!

Revisiting the Power Tube Testing Breadboard

WARNING: The circuit in this column contains dangerous voltages that can cause severe burns, shocks, or death. You must observe extreme caution in constructing and operating it. Neither The OTB *nor the author will be liable for any injury resulting from improper use of the techniques described in this article.*

In the last Breadboarding column I trotted out a hookup for emission-testing power triodes—big ones! My friend who haunts hamfests looking for high-power audio and transmitting tubes keeps bringing me these things. As one who buys and sells tubes and such, he needs to make sure of the condition of his merchandise. He'll be carrying this tester around with him from now on, I'll bet. You can make one, too. No more buying a big old tube for big new bucks and then finding out it is deader than the Cenozoic when you fire it up in your rig!

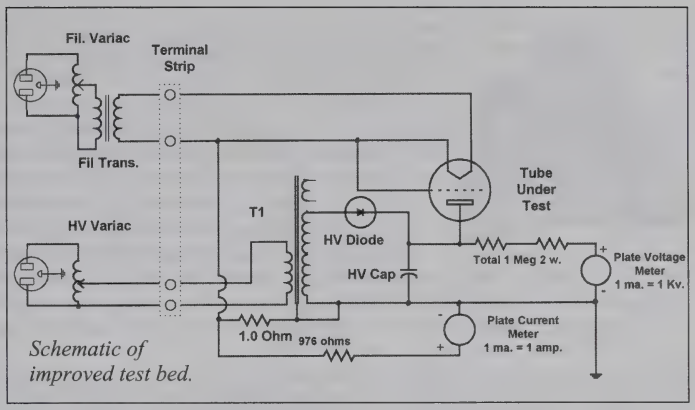
At first I just spread the circuitry all over my bench and exercised great care—working with one hand behind my back, and so forth. But my conscience, together with a smattering of knowledge about liability law acquired from my attorney wife, have joined together to force me to improve the testing setup.

You still need a data sheet for the tube you want to test and at least one fairly heavy Variac. Checking out a 250 watt power tube like the WE

Improved test bed for power triodes.

212 shown here is obviously going to require transformer iron of appropriate size. A microwave oven transformer is good for anywhere from 700 to 1200 watts, and will put out an easy 1000 volts AC.

To get a variable voltage from such a transformer means using at least a 7½ amp Variac to drive its primary, and the same thinking will hold for filament power. The 212E takes 13 volts at 6 amps, making 78 watts, so a multi-tap transformer or a second Variac is indicated. The breadboard rig illustrated uses a Stancor RT-204, which will give anywhere from about 5 to 29 volts AC at up to 8 amps, depending on how you connect the taps. So a Variac for the filament isn't really necessary, though it sure is convenient. An RT-208 would get you to 16 amps—enough to check out kilowatt tubes.

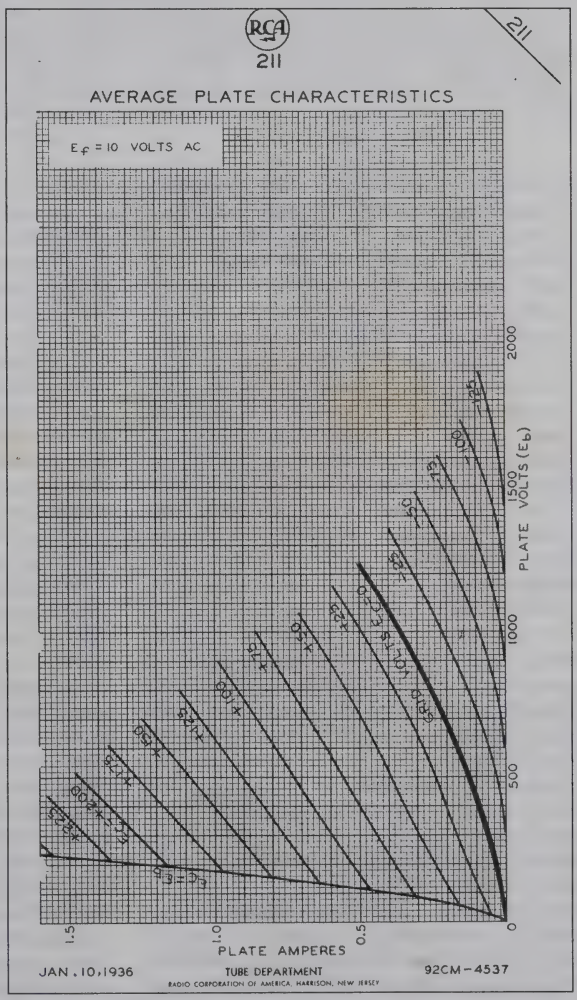


Schematic of improved test bed.

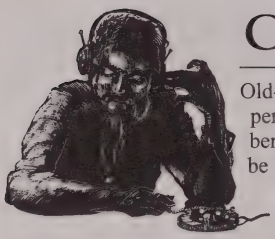
The circuit for this tester is improved over its forerunner in the previous column by being isolated from the power line. T1 is the oven transformer, and the rectifier diode gives us the variable B+ we need to check emission at zero grid bias.

My customer came up with a modern power tube socket, so that eliminates making connections to the big tube pins with alligator clips. You could wire two or three triode sockets of different sizes in parallel for the tester you'll be building to take to those swap meets. I used a couple of cheap DC meters for monitoring plate voltage and current (plus acting to bleed the big filter capacitor). The multiplier resistors can be tweaked as fine as you like by paralleling other resistors to make the meters read accurately.

(continued on page 71)



Characteristic curves for the Type 211.



CLASSIFIED ADS

Old-time ads are free to members collecting and restoring equipment for personal use. Please observe the following: (1) one ad per issue per member; (2) include as SASE if acknowledgement is desired; (3) material must be more than 25 years old and related to electronic communications; (4) give your full name, address and zip code; (5) repeats require another notice (we are not organized to repeat automatically); (6) the AWA is not responsible for any transaction; (7) we retain the right to reduce an ad's size if over seven lines; (8) AWA does not accept commercial advertising in this column; and (9) closing date is six weeks prior to first day of month of issue. Ads received after that time will be held for the following issue. Mail all ads to: **RICHARD RANSLEY, P.O. BOX 41, SODUS, NY 14551.**

IMPORTANT!

OTB classified ads are now available for browsing in the "*OTB On Line Edition*" on our internet web site (www.antiquewireless.org). This practice will give members dramatically increased exposure for their ads.

SELL/TRADE—BC/SW TUBE RADIOS

Western Electric Model 4D radio receiver, serial # 236., no tubes, $700. A. B. Smith, 65 Glenwood Rd., Upper Montclair, NJ 79344-3387

SELL/TRADE—GENERAL

U. S. or Canadian Forest Service radios, any model or condition, especially an "SPF" set. Typical manufacturers include Spokane Radio, Spilsbury, Radio Specialty, Oregon Electronics, Western Wireless, and others. Have classic communications gear and telegraph keys to trade, or cash. Rick Ferranti, WA6NCX, 1341 Cedar Street, San Carlos, CA 94070-4755 (650) 859-2859 E-mail: remler@juno.com

Army Signal Corp #BC-348 radio, $160., Coronado 8 tube series A1 console with big round dial & buttons, $95., ten transistor radios, all work, no cracks & no batteries, all for $35., Northome 10" drum speaker, $100., Zenith "Royal 1000" with plastic cover & original box, $165. Need chassis for Crosley "Super Buddy Boy" #122. Thank you. Walt Wrabek, 10750 159th Ave., Menahga, MN 56464

Heavy duty Fairchild playback turntables, 45 and 33 speed. Include Pabst hysteresis motors, large wood bases. One with Empire playback arm, one w/o arm, $300. or $400. postpaid. SASE for photo, specs. Charles Graham, 4 Fieldwood Drive, Bedford Hills, NY 10507 (914) 666-4523

Crosley Collectors! I have a new old stock, never used, Crosley 7-1 Shortwave Converter. Uses 5 sets of plug-in coils, all of which are in original wrappings. The AC cord is still wrapped. This is a 3 tube unit with knobs but no cabinet. The cabinet was an option. Tubes not included however the schematic is. This is a rare Crosley collectible and it's NOS status makes it even more rare. Asking $175. Charles Harper, 2000 Jackstown Road Paris, KY 40361 (859) 484-9393 E-mail: charper@ kyk.net

Operating demonstration 15 watt spark transmitter 1914 oscillation coil. Also includes a Hertz type spark transmitter using a Jacob's ladder and 9000 volts. Includes very early light bulbs, a UX211 and 201A with original sockets and original parts of quenched gap spark transmitter. Professionally made demo. Photo and detailed description available. Asking $300. plus shipping O.B.O. Frank Hutchins, W2MAV, Lake Josephine Dr., Sebring, FL E-mail: hutchins@ strato.net

Knight K.G. 600B Tube Tester; Knight K.G. 650 Radio Frequency Generator; misc. radio tubes, mostly peanut size; six volt car radio from Buick passenger car (models with three or four holes in side of hood and straight eight cylinder engine). Also have two car radios marked Ford (one with

the following: E5AF-188060AA; 8436 and the other E7EF-19B45 AA) Best offer. Fred Freebolin, 17 E. View St., Lombard, IL 60148 (630) 627-5343

A hundred 1945-55 kitchen-bedroom radios; twenty table television sets; photo enlargers for black & white and color, print drum dryer; parts to build 20 transmitters including chassis, meters and cabinets. Also a service shop with 20 testing instruments. Wish to sell each category to one person. Photos of everything available via E-mail. Francis H. Yonker, W2IBH, 1229 Inverary Place, State College, PA 16801 (814) 167-1400 E-mail: yonker1229@home.com

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Crosley 51, in excellent, like never used condition, with all tags and original instructions, $120.; Crosley 51 portable, all there but needs cleaning up, has original battery wires and tags, $115.; Freed-Eismann Model 10, scarce model, nice panel brass, $50.; Music Master Model 145, seldom seen model with slant front and odd panel, $50.; A.C. Dayton SX-5, early model, needs cleaning, $85.; Signal key and buzzer, on wooden board, $65.; DeForest vertical detector on incorrect wood base, $85. Dave Crocker, 35 Santuit Pond Rd., #4B, Mashpee, MA 02649 (508) 477-1578

Philmore mounted crystal detector in original package, $10.; Grunow 5B table radio with chrome deco grille, $125.; 1956 ARRL Handbook, $20.; Semaphore to Sattelite, $30.;Cavalcade of Broadcasting, $35.; Zenith 5L41 tube radio, $10.; copy of Pilot TV-37 owners manual, $5.; Zenith Royal 800 with plug-in transistors, $200.; Winston 2 transistor radio with whip antenna, $95.; Thomas Edison brand spark plug, $20.; collection of 2" and 3" CRTs, 11 assorted for $75. Bill Rolf, 3031 Center Ridge, Westlake, OH 44145 (440) 871-4547

Dayrad Model 20-A Tri-Test tube tester unmodified. See the February, 2001 *OTB* article (pgs 20-23). Complete schematics, instructions and set-up data, including a new roll chart for nearly 600 obsolete tube types, $65. + S&H. Also, a Dayrad Model 20 (same circuit, but no roll chart, $45. + S&H. Charles Kirsten, 15556 Sandra Lane, Sylmar, CA 91342 (818) 364-0491

Still thinning my collection. Have numerous consoles, 20s and 30s units. Have some Atwater Kent and other makes on chassis. Also have military equipment and some fine older amateur items. SASE for list. Malcolm D. Burdick, W1NOO, 156 Station Road, Hampton, CT 06247 (860) 455-9640, before 8:00 p.m. please.

6" coaxial speaker, 30 W., $10.; 8" speaker with tweeter, $8.; 6"×9" speaker, mint, $7.; 5"×7" speaker, excellent, $7.; 3"×5" speaker, $5. plus many more 2" to 8".; Stromberg Carlson mono audio amplifier 5AU35 w/P.P. 6L6s, $50.; NIB tubes 6SN7G-TB, $4.; 826, new, $4.; 829A, 6AS7G, $3.; 807s, 1625s, 2E26s, 866s, $3. each. Want schematic for Sprague TO-3 Tel Ohmite Condenser Analyzer. Onerio Sabetto, W8PIU, 1717 Burgess Rd., Cleveland, OH 44112-1103 (216) 481-1036

Wilcox Gay Recordio A-93 chassis. Includes 10 tube AM/SW receiver, turntable, motor, microphone for recording, additional knobs, parts, service info & schematic, $35. Jim Liqouri, 7 Sycamore Court, Atkinson, NH 03811 (603) 362-5712 E-mail: Jjligoure@aol.com

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Radios from the collection of the late Ted Babcock. Many Stromberg-Carlson radios, cone & horn speakers; RCA Radiola II; RCA panel radio: King 3 knob TRF; Radiola 25 with loop antenna; Crosley 50 & 51; Erla reflex kit; Westinghouse RA & DA; West. Elect 7A Amp.; Clapp Eastham HR & DD Radak; Federal panel radio; Aeriola Sr. Radio 7 Amp. (2 pc.); Crosley XJ & more early battery sets. Also many wood & plastic AC table radios. SASE for list with prices. Can E-mail pictures of most sets. Shirley Babcock, 497 Long Island Drive, Moneta, VA 24121 (540) 721-1222 E-mail: tedshirlb@aol.com

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SELL/TRADE—LITERATURE

AWA *Old Timer's Bulletins*. First ten volumes professional reprints. Missing Vol. #1 and Vol. #3. All others original copies, most in envelopes as received. Condition excellent. Also missing Vol. 20 #1, Vol. 31 #1, Vol. 39 #3 and Vol. 39 #4. Total issues 159. Asking $200. plus shipping. Wes Chatellier, 1950 Chevelle Dr., Baton Rouge, LA 70806 Phone (225) 927-2199 (evenings) E-mail WesW5DPM@Eatel.net

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Radio schematics & Service Data, $2.50 plus #10 SASE for the following: U.S. receivers 1920s to 1970s, Canadian receivers 1920s to 1970s, Australian receivers 1930s to 1950s. Price is for 1 to 5 pages of data per model. Over 5 pages copy charge is 20 cents per page. Questions /quotes, SASE please. Want radio club

publications, newsletters & Journals. Steve Rosenfeld, P.O. Box 418, Manahawkin, NJ 08050 (609) 978-0331 E-mail: srosenfeld@ens.att.com

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UR old QSL card?? Free search by callsign, will send you a find at $ 3.50 ppd. Collection from the 1950s, 60s and 70s. I collect old QSL card collections. Chuck Barton, NZ5M, 8705 Toledo Avenue, Lubbock, TX 79424 (806) 698-8767 E-mail: CRBCSI@prodigy.net

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Siginificant portion of my magazine collection for sale. Some issues are rare, others more common, all are in the 1920s & 1930s—magazines are Radio Industries, Radio Age (Don Patterson's Pub.), Radio Retailing & Jobber, Western Music and Radio Trades Journal, West Coast "73", Radio Call Books, U.S. Patent indexes, Radio Dealer, Radio Today, Radio Industries, Wireless Age, Talking Machine World, R-9, Jones Handbooks plus special Jones publications, ARRL handbooks, Wireless Manual (1921), Radio Listener's Guide and more. SASE for listing. Floyd Paul, 1545 Raymond Ave., Glendale, CA 91201 (818) 242-8961

SELL/TRADE—PARTS

High voltage capacitors for tube radio restorations. Info and prices: Dave Cantelon, 42 Clematis Rd., North York, Ontario, Canada, M2J4X2; justradios@yahoo.com; www.justradios.com

SELL/TRADE—TRANSISTOR/ CRYSTAL SETS

Galena crystals and homemade galena crystal radios. Parts and schematic. L. Gardner, 458 Two Mile Creek Road, Tonawanda, NY 14150 E-mail: radiolen@aol.com

SELL/TRADE—TUBES & TRANSISTORS

Rare tubes: WE205D, CX299, 2-UX199, 230, 2-GE PJ23, type 12, UX222, C484, 2-24, 4-UV201A, 2-CX301, SX301A, 868, C324A, 3-UY224A, 56, 247, 234, X280, De Forest audion 410, JX245, 2-MX281, 2-81, 22, CX380, SY-224, X112, UX112A, 174A, 234, CX310, UY227, UX171A, CX112A, 2-JX245, 2-AX201A, 3-UX201. All globes and good filaments. Also have 129 hearing aid tubes and many more Frank Hutchins, W2MAV since 1939, 2034 Lake Josephine Ave., Sebring, FL 33875 (863) 655-0259 or E-mail: hutchins@strato.net

6 volt and 12 volt, 7 and 9 pin tubes, tested good, 25 cents each or 5/$1.00. Leonard Granger, 458 Two Mile Creek Road, Tonawanda, NY 14150 E-mail: radiolen@aol

SELL/TRADE—TEST GEAR

Boonton, "Q" Meter, Type 190-A. 20 to 260 mHz, excellent condition, $200. Leonard Gardner, 458 Two Mile Creek Road, Tonawanda, NY 14150 E-mail: radiolen@aol

WANTED—BC/SW TUBE RADIOS

Empty cabinet for Grebe CR-9; Zenith Model 103 (1933) hi-boy console; Zenith 3R regenerative set (1923). Thanks! Chris Hicks, 57 Jameson Hill Rd., Clinton Corners, NY 12514 (845) 266-4257 E-mail: hicksriley@earthlink.net

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"Top of line" allwave radios from the '34-'38 era. Consoles: Lafayette 24 tube, Knight 19 tube, Sparton 1466, AK112, 312, 812; GE 205 & 208 and others. Table radios: Patterson 12 tube, Westinghouse WR-214; Pilot; Emerson 134; Gilfillan 116B; Lafayette F36 and others. What do you have? Mark Oppat, 253 Blanche St., Plymouth, MI 48170 (734) 455-4169 E-mail:moppat@ flash.net

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SE-1071 Western Elec Audion box or triode A, detector one-step amplifier to go with SE-1220. Also, looking for DeForest

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Interpanel. Mike Bald WD5GLW, 7637 S. Quebec Pl Tulsa,OK 74136 918-492-7361 RadioMB@aol.com

WANTED—GENERAL

Code Practice tapes and machine for advanced beginner. Charles Graham, 4 Fieldwood Drive, Bedford Hills, NY 10507 (914) 666-4523

Firth Model 35A receiver; Westinghouse Type CAY-2601 filament ammeter (0-1.5A used in the IP501, and SE 1030); I have been looking for a Connecticut Telephone and Electric Type J-113, 3 ohm rheostat, for over 2 years now! (check your parts box, will pay $100. for one, and $150. for a complete one with knob and dialscale!). J. C. Woychowski, 119 Laurelwood Drive, Niantic, CT 06357 (860) 739-6579 or (860) 739-4673 fax

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Looking for vacuum tubes and capacitors to buy. Either used, new, small number or estates are welcome. John Yeung, 55 Gloxinia Cres.,

Toronto, Ontario, Canada M1W 2C5 (416) 876-8663—will pay for toll calls

3AQP1 cathode ray tube. Brian Shore, KV4EX, 133 Buckwood Drive, Richmond, KY 40475-2221 (859) 623-5496, shore9900@ipro.net

WANTED—KEY & TELEGRAPH

Looking for oddball bugs (speed keys) for my collection. Obscure manufacturers or weird configurations such as vertical or right angle always welcome. I have a few trades left but will buy one or a complete collection to add a new one. Gil Schlehman, K9WDY, 335 Indianapolis St., Downers Grove, IL 60515

WANTED—LITERATURE

Looking for complete set of Sams Photofacts folder 1 through 2,000 or 3,000 or so and Riders Vol. 23. Dave Cantelon, (416) 502-9128, justradios@yahoo.com

WANTED—PARTS

Looking for a front cover for both Sony CRF-320 and Sony "Earth Orbiter" CRF-5090. Also need a back battery cover for Zenith 7000, the made in Taiwan model. Thanks! Max Bianconi, 18 Sweetman Dr., Dundas, Ontario, Canada L9H-7N6 (905) 628-1262

For leather Zenith 600 Series Oceanic, I need antenna tip, two knobs and plastic main front panel. Parts radio okay. Also need log for Zenith R7000 Series Transoceanic. Reproduction okay. Patrick Sena, 517 161st Avenue, Redington Beach, FL 33708 (727) 395-9333 E-mail: b.sena@worldnet.att.net

BREADBOARDING, *continued from page 67*

I'm still recommending using a high-voltage filter capacitor if you have one good for about 1500 volts DC (that's roughly equivalent to a 1000 volt AC oil capacitor)—if only to cut down the ungodly hum this thing makes at full power.

To use this breadboard tester, you wire the filament transformer, or set the filament Variac, for the correct filament voltage for the tube according to the data sheet. Then you cautiously advance the plate Variac while you look at the DC voltmeter measuring the plate voltage. If it reads backward or negative, your rectifier is connected backward!

If your meter reads correctly, run the voltage up slowly until you start to see plate current flowing. Bearing in mind that the grid is connected to the filament or cathode, take a look at the characteristic curve for your tube—the one for the 211 is shown here—and see whether the values you're reading for plate current and voltage fall on or near the curve for zero bias at 200, 500, 1000, or whatever voltage you're applying to the plate.

If so, you've probably got a good tube. If not, the tube's cathode emission is low. Remember: the tube's plate may glow red if you leave power on too long at the higher plate voltage settings. You need only keep the power on for long enough to take a pair of readings.

After taking your measurements, you can zero the plate Variac and start breathing again. Even though the test circuit isn't well filtered, the plate voltmeter will be reading the average value of the DC plate voltage, and the current meter, though it will be carrying mostly an ugly half sine wave, will register its average just fine.

Check the data sheet for the tube you're testing to determine the kind of filament it came with. Some have coated filaments, made for pretty much constant emission over the life of the tube, but some tubes like the 211, that were delivered with thoriated tungsten filaments, get tired cathodes after long hours of use. The thorium atoms near the filament surface get used up, raising the work function of the filament and lowering emission.

Thoriated filaments will generally glow white-hot at rated voltage, while coated filaments stay dull red-to-orange. Now and then you can "flash" a tube to pull some more thorium atoms toward the surface of the filament. Read up on that elsewhere—it's seldom worked for me.

How to improve this breadboard?Well, you could add a grid bias supply and take Ip and Ep readings for different values of (negative) grid voltage. Using a high-voltage bridge rectifier would double the effectiveness of whatever filtering you're using. How about a separate bleeder resistor as a safety measure in case the voltmeter let go? Building everything into a nice enclosure would be swell—but then it wouldn't be a Breadboard any more!

Next time—back to history: The super-regenerative circuit of Edwin Armstrong.

MUSEUM,

continued from page 74

the Museum.

Today we're announcing the earliest possible beginning of a new program where we want members to adopt a radio. We have more nice radios needing restoration than we can ever do on our own and thought some members out there may want a no cost project to work on. It would work something like this; we list radios available to work on. Members select an item. The Museum sends it to you at our cost. You get the fun and enjoyment of restoring it and we arrange for the return. The Museum will help with parts and materials as much as possible. So, now you know as much as I do. Stay tuned.

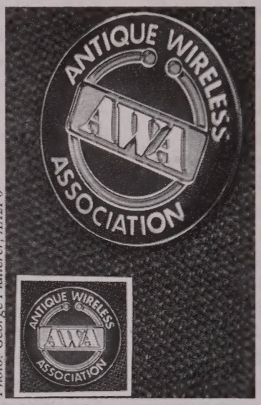

Photo: George Platteter, AA2FO

The handsome new AWA pin. Actual size 1" in diameter.

Available now, however, is a brand new AWA lapel pin that will replace the far-too-expensive hand-made gold pins of yesteryear. This has been a long-awaited item. The new pin maintains the rich-looking gold stylized AWA Logo surrounded by the Hertz loop, but adds the words Antique Wireless Association wrapped around the loop in bright gold. The words are contained in dark blue cloisonné finish and the pin is clutch mounted. Profits from the sale go to support the Museum, so wear it proudly. The price is $6.00 postpaid in U.S. and Canada. make your check out to "AWA Museum" and send it to me at 187 Lighthouse Rd., Hilton, NY 14468.

I regret to report that the AWA museum has lost an old-time guide and supporter. He was Chet Minges, W2VVG. Chet wasn't too active lately due to health problems, but he was one of the Bruce Kelley barn boys of the early days.

Taking advantage of the good WX conditions, members of the W2ICE radio club are out doing much-needed antenna maintenance. W2AN/ W2ICE stations have been pretty quiet due to lack of aerials, but look for their ether-burning signals again soon. President Fizette will write in more detail of the new AWA/Museum organization, but a special working session of the AWA Board and Museum Trustees is scheduled this Summer to finalize arrangements on this much too drawn out task.

Plans are already being penciled in for display improvements and changes for the Spring of 2002. As always, I encourage and welcome your ideas on how to improve your museum. For myself and the crew, S'Long for now.

Ed Gable

Ed Gable K2MP/W2AN
Museum Curator

RECENT MUSEUM DONORS (compiled June 26, 2001)

Ray Jobes WB2AFQ .....300 Receiving tubes—modern
Fred Kubias W7BAC .....Test equipment, ham items, large collection
Steve Beaulieu .....Nice E.H. Scott phono/radio console
Harris Corporation .....Modern Military; PRC-117, RF5800M/H, more
Chris Soderstrom .....Altec-Lansing, A-K, books, components, more
Paul Wenk .....Large collection 30s TX tubes
Ed Gable .....ICOM IC245, IC2AT, IC4AT, in boxes
Charles Lewis .....A-K 60, Harmon-Kardon, much more
Microwave Data Systems, Inc. .....Modern 900 MHz data transceivers, three models
Charles Gramm KB4ZB .....S-38, TX Tubes, books, more
Jack Frawley .....10,000 QSL Cards
Stan Avery WM3D .....DX-1000 RX, Pioneer LD-V-3000
Warren .....PeaseEarly tubes; WD-11's, DV series, 40 pieces
Fred Gern K2FR .....2000 QSL cards, current ARRL Honor Roll
Russell deLaubell .....Stewart Warner 950 console
Stewart M. Merson Family .....Cash in memory of Stew Merson
Rodney Shrock KD3OR .....Cash donation
George Platteter AA2FO .....Photographic services

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MUSEUM NEWS

Your Museum opened on schedule for the season in May and has been doing a brisk business. As expected, the new operational RTTY display has been well received by all, especially a cute little ten year old girl and her parents. I was demonstrating the model 19 TTY unit to them and, after printing out a message, I tore the paper off and handed it to her. She said "What's that?" I explained again how the messages were printed from the punched paper tape and she interrupted, "No, what's that stuff ?" Oh....that's carbon paper so we can get three copies. "Wow, that's a great idea!" she exclaimed.

One of the great joys of being a museum guide is the people you meet and the sharing of experiences. The "Made in Rochester" display is also getting lots of attention and we're adding items almost weekly as we discover them.

When looking at the donor's list you will find an interesting trend: being given are new items that will be tomorrow's antiques and communications oddities and curiosities. Harris Corporation offered new Military items in their PRC-117 and RF-5800 series. Get this, their new tactical handheld radio covers 30 to 512 Mhz, both voice and data, contains communications security, frequency hopping, selective calling and networking, and GPS capability. Equally impressive is the new line of 900 MHz data transceivers donated by Rochester's Microwave Data Systems, Inc.

I encourage the acquisition of tomorrow's antiques today when they are easily obtained, are typically in good condition and can be well documented. Another nice addition was the E.H. Scott custom built console which was in a house just a few miles from

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